# JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXVI Part 10

OCTOBER 1951

PAGE

The Secretary's Page . . . . . 337

Wisley in October . . . . . 339

Wind-Shelter and Wind-Tolerance. By W. Arnold-Forster. *Illustrated* . . . . . 341

Delphiniums and their Cultivation. By Allan Langdon . 348

Bud Blast Disease of the Rhododendron. By A. F. H. Baillie and W. F. Jepson. *Illustrated* . . . . . 355

The Chromosome History of Cultivated Nerines. By E. K. Janaki Ammal, D.Sc. *Illustrated* . . . . . 365

Chromosome Numbers in Hybrid Nerines. By E. K. Janaki Ammal, D.Sc., and Margery Bridgwater . . . 372

Notes from Fellows:

*Cryptomeria japonica* var. *spiralis*. By The Hon. Mrs. D. Bell. *Illustrated* . . . . . 376

*Erica australis*. By L. W. Smith. *Illustrated* . . 376

Plants to which Awards have been made in 1951 . . 377

Book Notes . . . . . 378

Proceedings . . . . . cix

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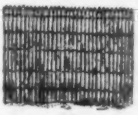

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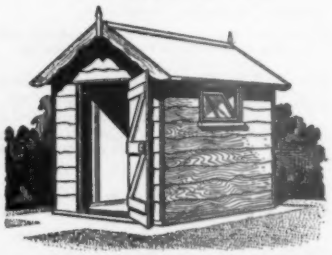

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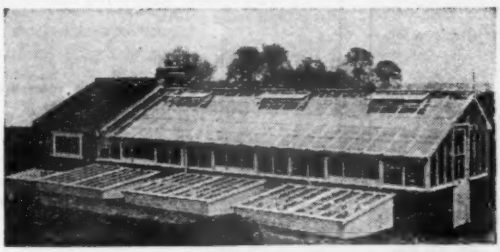

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| **Cornus Florida** — An amazing plant, foliage vermilion orange scarlet | 10/6 ea. |
| **Cornus Florida Rubra**—Foliage deep red and bronze | 10/6 ,, |
| **Cornus Kousa** — Graceful shrub, autumn foliage yellow, biscuit and red | 7/6 ,, |
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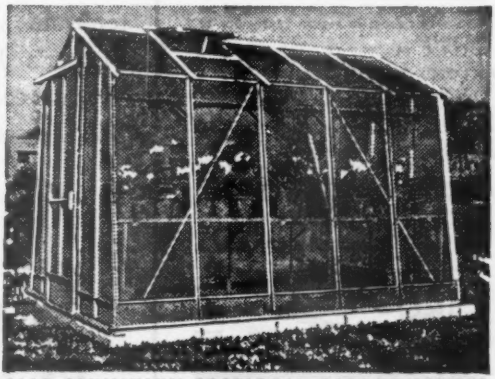

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Extracts from

# THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY

## GENERAL MEETINGS

### JULY 10, 1951

**FLORAL COMMITTEE B**—Lord ABERCONWAY, C.B.E., LL.D., D.Sc., V.M.H., in the Chair, and nineteen other members present.

**Awards Recommended:**

*Silver Flora Medal*

To Messrs. W. A. Constable, Ltd., Southborough, for an exhibit of Lilies.

*Flora Medal*

To Messrs. Burkwood & Skipwith, Ltd., Kingston, for an exhibit of flowering shrubs and plants.
To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.
To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of flowering shrubs.

*Banksian Medal*

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of flowering shrubs.
To Mr. C. Gilbert, Woking, for an exhibit of succulents.
To Mr. M. Haworth Booth, Haslemere, for an exhibit of Hydrangeas.
To Messrs. Kew Topiary Nurseries, Ltd., Richmond, for an exhibit of clipped trees.
To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of rock-garden plants.

*First-Class Certificate*

To *Philadelphus* × 'Beauclerk' (*P.* × 'Sybille' × *P.* × *burfordiensis*), as a hardy flowering shrub (votes unanimous), from the Hon. Lewis Palmer, Winchester.

*Award of Merit*

To *Lilium* × 'St. Nicholas' (*L. Martagon album* × *L. Hansonii*), as a hardy flowering plant (votes unanimous), from the Hon. Robert James, Richmond, Yorks.

*Preliminary Commendation*

To *Lilium* × 'Helen Carrol,' as a hardy flowering plant (votes unanimous), from W. Bentley, Esq., Newbury.

**Other Exhibits**

*Acer monspessulanum* var. *microphyllum*, exhibited by Captain Collingwood Ingram, Benenden, Kent.
*Fuchsia corymbiflora*, from Chas. J. Howlett, Esq., Earley, Reading.
*Holodiscus discolor*, from Capt. C. Ingram, Benenden.
*Lilium* × 'Highdown,' from Col. F. C. Stern, Goring-by-Sea.
*Magnolia Delavayi*, from W. J. Hepburn, Esq., Hyde Park, W. 2.
*Philadelphus* × 'Swan Lake,' from the Hon. Lewis Palmer, Winchester.
Rose 'Will Scarlet,' from Messrs. T. Hilling & Co., Chobham.
*Salvia bulleyana*, from Messrs. M. Prichard & Sons, Ltd., Christchurch.
*Veronica salicifolia* 'Midsummer Beauty,' from Messrs. J. Cheal & Sons, Ltd., Crawley.
*Zenobia pulverulenta* var. *nuda*, from Mr. F. Street, Woking.

**ORCHID COMMITTEE**—Mr. GURNEY WILSON, F.L.S., V.M.H., in the Chair, and nine other members present.

**Awards Recommended:**

*Silver Banksian Medal*

To M. Lewis, Esq., The Birch Hotel, Haywards Heath, for an exhibit of Malayan Orchids.

*Cultural Commendation*

To Mr. B. White, for a fine plant of *Platyclinis filiformis*, exhibited by R. Strauss, Esq., Stonehurst, Ardingly, Sussex.

**Erratum**

The plant which received an **F.C.C.** on April 3, 1951, as *Cymbidium* 'Jean Conan Doyle' Stonehurst Variety should be called *C.* 'Rodaceia' var. 'Jean Conan Doyle.'

**JOINT BORDER CARNATION COMMITTEE**—Mr. T. Hay, C.V.O., V.M.H., in the Chair, and thirteen other members present.

**Award Recommended:**

*Award of Merit*

To 'Pink Model' (for exhibition) (votes 7 for, 1 against), 'Downs Unique' (for exhibition) (votes unanimous), both shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

**Selected for Trial at Wisley**

'Ripston Gallant,' shown by Messrs. J. E. Galbally, Ripston Road, Ashford, Middlesex.

**Other Exhibits**

'Lady Havers,' 'Yvonne Truckel,' Seedling 6A, and 'Moonbeam,' all shown by Mr. Geo. E. Toms, Appley Nurseries, Ryde, Isle of Wight.

'George Maxwell Gee,' shown by P. Lower, Esq., 106 Woodward Road, Dagenham, Essex. (Not a sufficient number of open blooms shown.)

**JOINT PERPETUAL FLOWERING CARNATION COMMITTEE**—Mr. Geo. Monro, V.M.H., in the Chair, and nine other members present.

**Award Recommended:**

*Award of Merit*

To 'Danesmead Crimson' (for market) (votes unanimous), shown by F. Hicks, Esq., Danesmead, Golden Hill, Hordle, Hants.

**JOINT DELPHINIUM COMMITTEE**—Mr. T. Hay, C.V.O., in the Chair, and eight other members present.

**Award Recommended:**

*Award of Merit*

To 'Ruffles' (for exhibition) (votes 6 for, 0 against), shown by Messrs. Blackmore & Langdon, Bath.

**Selected for Trial at Wisley**

'Dame Myra Curtis,' 'Fred Yule,' 'Mayor of Bath,' and 'Melora,' all shown by Messrs. Blackmore & Langdon, Bath.

Belladonna 'Susan,' shown by A. T. Knight, Esq., White Ness, West Clandon, Surrey.

Seedling B.1 (White), shown by Mrs. B. G. Wort, 18 Upper Woodcote Village, Purley, Surrey.

**Other Exhibit**

'Kingswood,' shown by Messrs. Blackmore & Langdon, Bath.

**JOINT DIANTHUS COMMITTEE**—Mr. Geo. Monro, V.M.H., in the Chair, and thirteen other members present.

**Selected for Trial at Wisley**

Seedling M. 11/1, shown by F. R. McQuown, Esq., 39 Farm Avenue, London, N.W.2.

**Exhibit for Naming**

Dianthus, hybrid pink, unknown but believed to be a seedling Allwoodii somewhat like Allwoodii 'Ruth,' sent by H. Uxley, Esq., 14 Julians Road, Stevenage, Herts.

**JOINT ROCK GARDEN PLANT COMMITTEE**—Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., in the Chair, ten other members and Mr. R. L. Harrow, V.M.H., visitor, present.

**Awards Recommended:**

*Award of Merit*

To *Thymus longiflorus* as a hardy flowering plant for the rock garden and alpine house, from Messrs. W. E. Th. Ingwersen Ltd., Birch Farm Hardy Plant Nursery, East Grinstead, Sussex.

To *Mitchella repens* as a hardy flowering plant for the rock garden and alpine house, from The Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

To *Anagallis tenella* 'Studland' as a hardy flowering plant for the rock garden, from The Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

*Cultural Commendation*

To The Director, R.H.S. Gardens, Wisley, Ripley, Surrey, for a particularly well-grown plant of *Anagallis tenella* 'Studland.'

**Other Exhibits**

*Primula umbratilis alba*, shown by Messrs. W. E. Th. Ingwersen Ltd.

# JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXVI Part 10

October 1951


## THE SECRETARY'S PAGE

### ANNOUNCEMENTS—OCTOBER AND NOVEMBER

**Shows**

| | |
|---|---|
| TUESDAY, October 9<br>12.30 P.M. to 7 P.M.<br>WEDNESDAY, October 10<br>10 A.M. to 5 P.M. | Fortnightly Show.<br>Fruit and Vegetable Show. |
| TUESDAY, October 23<br>12 NOON to 6 P.M.<br>WEDNESDAY, October 24<br>10 A.M. to 5 P.M. | Fortnightly Show.<br>Tree and Shrub Competition.<br>Floral Arrangement Competition for Professionals. |
| TUESDAY, November 6<br>12 NOON to 6 P.M.<br>WEDNESDAY, November 7<br>10 A.M. to 5 P.M. | Fortnightly Show.<br>Floral Arrangement Competition for Amateurs.<br>*British National Carnation Society's Competition.* |
| TUESDAY, November 20<br>12 NOON to 6 P.M.<br>WEDNESDAY, November 21<br>10 A.M. to 5 P.M. | Fortnightly Show. |

**Lectures**

TUESDAY, October 9 at 3 P.M. Masters Memorial Lecture, "Changes in Fruit Varieties and Production Methods since the time of Dr. Masters," Part II, "Tree Fruits," by DR. H. V. TAYLOR, C.B.E., V.M.H.

TUESDAY, October 23 at 3 P.M. "A Woodland Garden in Somerset" by MR. N. HADDEN.

TUESDAY, November 6, at 3 P.M. "Unusual and Ornamental Plants for Hedges" by MR. F. P. KNIGHT.

**Colour Films**—Four films prepared by Shell Chemicals Ltd., will be shown at 3 P.M. on Wednesday, October 10, in the Lecture Room of the New Hall. The titles of the films are :—"How to Spray," "Brown Rot," "Leather Jackets" and "Greenhouse White Fly."

**Demonstrations at Wisley**—The following demonstrations will be given at Wisley, that on the second day being in each case a repetition of that given on the first:—

*Vegetable Garden*

October 3–4. Digging, Trenching, Manuring and Composting. (Commencing at 2 P.M.)

*Fruit Garden*

November 28–29. Pruning of Fruit Trees. (Commencing at 11 A.M.)

**Results of the Examination for the National Diploma in Horticulture**—This is the most important of the examinations conducted by the Society, and is intended for the professional horticulturist. Candidates for the Examination must produce evidence of having followed the vocation of horticulture for specified periods; both the preliminary and final examinations involve practical tests conducted at Wisley or elsewhere, as well as written work.

In 1951 there were 171 candidates for the Preliminary Examination, of whom 37 acquitted themselves sufficiently well to be allowed to take the Final Examination in due course. At the Final Examination there were 45 candidates, 26 obtaining the N.D.H. in the various Sections, as follows:—

Section I—*General Commercial Horticulture*

MR. A. C. BUNT — MR. J. INGRAM
MR. A. F. R. FISHER

Section II—*Fruits in the open.*

MISS M. J. TAYLOR — MR. P. J. WOODWARD
MR. R. C. ROUND

Section III—*Vegetables in the open*

MR. H. S. BELL

Section V—*General Horticulture*

MISS M. PORTER — MR. C. J. MITCHELMORE
MR. E. C. BOX — MR. D. W. PURDIE
MR. S. CHALLENGER — MR. E. W. PYMONT
MR. G. E. FITT — MR. I. SANDWELL
MR. J. R. HARE — MR. H. THORPE
MR. C. W. W. HENDERSON — MR. D. W. WAY
MR. D. A. J. LITTLE — MR. A. B. WEBSTER
MR. R. D. MACKENZIE

Section VIII—*Public parks, grounds and open spaces*

MR. A. AGAR — MR. J. W. NOBLE
MR. C. D. O. MUERS — MR. A. L. WINNING

**Publications**—*The Fruit Year Book, 1951/1952*, will be published early in October and contains many articles of especial interest to fruit growers. There is an important section on the raising of new varieties

of fruit and on rootstocks for fruit in N. America. It also contains full reports of the Fruit Group discussions. The Daffodil and Tulip, Lily and Rhododendron Year Books will be published in November.

**Year Books**—It has been decided that in future the Year Books will be dated for the coming year instead of for the year that has passed. In order that no year shall appear to have been missed, the Year Books being published this autumn will be dated 1951/1952 while the next succeeding issue will be dated 1953.

It is regretted that owing to considerable increases in printing and paper costs, it has been necessary to raise the price of the Year Books to 15*s.* 0*d.* each. Fellows and Associates of the Society may obtain them at the specially reduced price of 12*s.* 6*d.*, postage and packing 9*d.* extra. This concession is only applicable to copies purchased direct from the Society's offices and cannot be made available for copies purchased through a bookseller. An order form for the use of Fellows and Associates will be included in the November JOURNAL. Applications for copies at this reduced price must quote the serial number shown on the Membership ticket.

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## WISLEY IN OCTOBER

THE Gardens are looking extremely colourful this month; the autumn shades are at their best in the Pinetum, Seven Acres, and the Woodland Garden, while early in the month flowers are still to be found among the Chrysanthemums, Michaelmas Daisies, and, until frosted, the Dahlias also, planted in the floral trial beds.

As an introduction to the glorious colours of autumn the visitor cannot do better than begin his tour by visiting the Azalea Garden which lies to the west of the greenhouses and continue from there to the Pinetum, a sunny day in October being one of the best times for a visit, as the varying shades of green are bright and clear, many of the trees bear highly ornamental cones and the warm colouring of the deciduous trees and shrubs is thrown into sharp relief against the darker conifers. The leaves of two shrubby Sumacs, *Rhus copallina* and *R. Toxicodendron* are an intense shade of crimson, although the latter cannot be recommended for general planting as the leaves are poisonous to the touch. There is a clump of *Viburnum Opulus*, the purple-red leaves falling to reveal clusters of translucent scarlet berries while nearby the clear yellow leaves of the graceful *Acer saccharinum laciniatum* stir in the breeze to expose glaucous undersides. Where the Pinetum merges into Seven Acres are a profusion of Colchicums and some finely coloured trees of *Prunus Sargentii*. In Seven Acres itself is *Aesculus parviflora*, known as the Bottlebrush Buckeye and the best shrubby hardy horsechestnut. It makes a broad spreading shrub up to ten feet in height and although often used as a specimen plant its ability to stand shade makes it valuable as ground

cover in thin woodland. There are the red-stemmed, blue-fruited Dogwoods, Spindleberries, Witch Hazel, and a well-shaped tree of *Parrotia persica*, the leaves of which change to shades of bronzy-green, pink and yellow. The Heathers have finished flowering apart from *Erica vagans grandiflora* which makes a startlingly bright splash of icing-sugar pink among its faded chestnut-brown fellows, but the pond is the real focal point enhanced by weeping willows and waterlilies.

In the Wild Garden *Oxydendrum arboreum* is in flower, the name referring to the acid taste of the leaves which are turning scarlet above, the undersides remaining pale. *Disanthus cercidifolius* is also flowering, the spidery dark purple flowers which are placed back to back along the branches being revealed as the heart-shaped crimson-red leaves begin to fall. The leaves of *Fothergilla monticola*, which resemble those of the Witch Hazel, are changing to brilliant gold, while at ground level are drifts of *Cyclamen neapolitanum* and *Crocus nudiflorus*.

In the Award of Garden Merit Collection the scene is similar but here is to be found the outstanding *Euonymus alatus*, with attractively winged stems and leaves of an unbelievable shade of cardinal red. The Snowberry, *Crataegus Carrierei*, and a fine Holly, *Ilex Aquifolium camelliaefolia* are all fruiting.

In the Half Hardy House bulbous plants are much in evidence, such as Nerines, *Amarcrinum Howardii*, *Narcissus Panizzianus* and *Vallota purpurea*; this latter, known as the Scarborough Lily, is a native of South Africa and has umbels of vermilion funnel-shaped flowers which appear with the strap-shaped leaves. Other plants in flower include *Calceolaria Pavonii*, scarlet and yellow-flowered Abutilons and the blue *Salvia Pitcheri*.

The Temperate House is well stocked with flowers; two large Camellia plants are producing exquisite blooms, the first, *C. Sasanqua fragrans*, has single cup-shaped flowers with a boss of yellow stamens, and the other, *C. japonica* 'Magnoliaeflora,' thick-textured flowers with four tiers of petals resembling a delicate pink Waterlily. The side staging is bright with a variety of plants, among them *Lindenbergia grandiflora* with creamy-yellow spikes, variegated leaved Coleus, large-flowered Begonias, *Beloperone guttata* or Shrimp Plant, and brightly coloured varieties of *Hibiscus rosa-sinensis*. In the centre bed *Rhododendron mucronatum* is at the commencement of its lengthy floral display as are *Tibouchina semidecandra* and *Loropetalum chinense*. Trained against the roof supports are the pretty waxen, pink umbels of *Hoya carnosa*, yellow-flowered *Hibbertia volubilis* and the tangerine-coloured spikes of *Buddleia madagascariensis*.

In the Stove House many orchids are coming into flower, other sections of the house being well stocked with exotic plants valued either for flower or foliage. Among the former *Gesnera chromatella* and waxen, attractively veined flowers of *Agapetes macrantha* will be especially admired, while those in search of a plant for a hanging basket will find a good example in *Columnea gloriosa*, the curtain of hanging stems carrying enormous hooded scarlet flowers.

Outside the greenhouses bays at the foot of the rock bank are planted with *Gentiana sino-ornata* and in a nearby frame is an attractive shrubby

sage from South Africa known as *Leonotis Leonurus* or Lion's Ear. It grows to a height of five to six feet bearing tight whorls of densely hairy, tawny-orange hooded flowers. Unfortunately it is frost-tender but is well worth growing if possible.

The last flowers have faded in the Rock Garden but it is enjoyable to walk across the alpine meadow to admire *Cyclamen neapolitanum* growing beneath bright crimson and scarlet Japanese Maples, and when viewed from here the scarcity of flowers is indeed no disadvantage, for their place is taken by balanced design and imaginative choice of dwarf shrubs, the scene highlighted by a bold group of orange-scarlet *Kniphofia Galpinii*.

In the Alpine House are a number of Sedums such as *S. cauticolum*, the leaves turning crimson with age, the gnarled stems of *S. multiceps*, deep rose-pink variegated leaves of *S. Sieboldii variegatum* and red-brown orbicular-leaved *S. Stahlii*. The blue-grey leaves of *Cotyledon Purpusii* and Saxifrages contrast with the bright ruby ones of *Vaccinium Arctostaphylos*.

Outside this house the Gazanias will continue to flower until cut by frost as will late-flowering half-hardy annuals on the border on Weather Hill.

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# WIND-SHELTER AND WIND-TOLERANCE

*W. Arnold-Forster*

(*Lecture given on April* 17, 1951; LORD ABERCONWAY, C.B.E., LL.D., D.SC. V.M.H., *in the Chair*)

IN these Atlantic islands a great many gardeners have a special interest in problems of wind-shelter and wind-tolerance; for, whilst this country enjoys a climate remarkably frost-free for so northerly a latitude, it has to reckon with an exceptional amount of sea wind, especially in coastal areas. (London has much less frost than New York though New York lies ten degrees further south; but on the other hand West Cornwall has much higher mean wind velocities than the west coast of California).

The following notes are based on observation in West Cornwall and on over thirty years of experiment in a small garden on the treeless moorland between St. Ives and Land's End. This garden, half a mile from the sea, is over 600 feet above sea-level, so exposed that Blackthorn only reaches a height of two feet; the Ash trees inside the gate, planted a century ago, are still only 17 feet high.

## SOME WIND-HARDY TREES

If you had to choose a few trees for a very windy site in a mild coastal district, what would be your choice? Most of the ordinary deciduous trees would be useless. Ash and Sycamore and perhaps Wych Elm would just do, the best being Ash. As for evergreens, Scots Pine has proved invaluable on the west coast of Scotland, as was shown by an article on Inverewe in the JOURNAL for November 1950. But my first

two choices of trees for such a climate as Cornwall's would be *Pinus radiata* and *Quercus Ilex*.

It is *Pinus radiata* (*insignis*) which provides the main shelter for so exposed a site as Tresco Abbey Gardens in the Scillies, and which has quickly wooded the landward slope of St. Michael's Mount. No other tree, so far as present experiment shows, can thrive so well on the sterile subsoil that lies unevenly over the sites of disused tin mines. Isolated, it can make a magnificent specimen, as at Caerhays Castle or Dartington Hall. But it has several drawbacks. Its safe life is only about 105 years. Its needles blow about the garden and make a carpet in which few plants thrive. (*Correa virens* and Tree Lupin are among the exceptions.) Young trees, properly prepared and planted in April at about a foot high, grow very fast, but fifteen years later they will let through a damaging draught unless the planter has had the foresight to plant a screen of evergreen bushes to prevent this.

In the colder counties the Corsican Pine, *Pinus Laricio*, could replace the more frost-tender *P. radiata* of Monterey. But I wish some authority with adequate resources would undertake comprehensive experiments to test the wind-tolerance of a great many trees, including conifers, under severe conditions.

What a precious asset we have, for our milder counties, in *Quercus Ilex*—a tree so beautiful in form and colour and so remarkably tolerant of wind. It thrives close to the sea and up on the moors, in Cornish damp as well as in sunburnt gardens of Rome. No tree excels it as a wind-shelter; it has been the nurse of the great garden at Abbotsbury, close to the sea, and can do as much for a little garden on the moors. It is a slow grower, certainly, with an Oak's sensitiveness to transplanting, and tidy gardeners curse its leaves falling in May; but no tree better deserves a place in a windy garden, no tree should be more jealously guarded against reckless felling and mutilation.

The third tree I will mention is *Olearia Traversii*. For small gardens close to the sea this is a most valuable evergreen, since it is very rapid in growth as well as wind-hardy, and very easily propagated by cuttings. (Fig. 165). It is not hardy enough for cold gardens, and is not reliable far from the sea; but it stands enough frost to have been regarded as a stand-by in Scarborough's windy public gardens thirty years ago. The plant has no beauty of flower, but the white underside of its leaf gives it much of the silver Poplar's charm in a wind. It grows so fast that it is apt to overstrain its anchorage unless topped when young.

## SOME SHRUBS FOR WIND-SHELTER

Next, consider some of the shrubs that can provide wind-shelter in severe exposure in the milder counties.

The toughest I know is the Mutton-bird tree, *Senecio rotundifolius* (Fig. 161). If grown in shelter, this loses its character and is not worth a place, but in full exposure it makes a compact rounded bush 10 feet high or more, its leathery leaves noble in design and gilded underneath when young. The plant is unshaken and undistorted by the severest gales up on Land's End moor or close to the sea, and in 1947, when most of the spring Gorse was killed to the ground in West Cornwall,

this was unscathed there, though it would not be hardy enough for the colder counties. Its trim spherical shape makes it good company for seaside architecture, but its dead leaves make some litter.

*S. elaeagnifolius* is useful as a dwarfer version. For a quite dwarf shrub I know of none more wind-hardy than *S. Monroi*.

*Olearia albida* (Fig. 164) rivals the *Senecio*, thriving in sites where Hawthorn or Blackthorn would be close-shorn or killed. Its flowers in August do not long keep their whiteness, but they are marvellously profuse and have a slight pleasant scent. This again is a plant for wild places: in a quiet up-country garden it looks dull.

*O. macrodonta major* (Fig. 160) is another outstanding shrub for wind-shelter—a much more effective plant than the typical *macrodonta*. It is easily propagated, grows fast, flowers into such a mass of white as the illustration shows, and when in flower diffuses a fresh pleasant scent far across the garden. When it is grown as a thicket, its buff trunks are hardly less attractive than those of tree Myrtle if relieved of loose old bark.

*Escallonia macrantha*, too well-known for description here, can quickly make a wind-proof hedge 8 feet high or more: in my garden an ancient hedge is over 12 feet high, red with flowers in June and noisy with bees. This plant, however, has a far spreading root-system, its flowered growths need cutting out, and its vigour is such that it may quickly outgrow its allotted space. *E. rubra* (so called) is another invaluable hedge plant, especially if planted in a double row along the top of an earth-filled wall. A wall thus heightened by planting, clipped once a year, can quickly provide shelter in the windiest site, without much impoverishing the adjoining soil. Other valuable Escallonias for hedging include *E. newryensis*, a tall plant, very fast growing: 'Glasnevin Hybrid,' 'Crimson Spire' and the bushy *organensis*.

Now, with only a mention of such useful wind-stoppers as *Euonymus japonicus*, the Pittosporums and *Griselinia littoralis*, I must turn to shrubs that are sufficiently tolerant of wind to be worth growing in very windy gardens when once some shelter has been established. I have put * after the most wind-hardy ones, and † after the most frost-tender.

## SOME WIND-TOLERANT SHRUBS

*Abutilon vitifolium*, like the Lavateras, stands a lot of wind, but needs staking. So do *Acacia juniperina* and *A. verticillata*. Some forms of *A. longifolia* are tough, and even *A. dealbata* or *decurrens* will succeed in a good deal of wind. *Azara microphylla* can be included. Many Azaleas are either very wind-hardy, such as 'Hinomayo,' *indicum* 'Kokin-shita,' and 'Gumpo,' or else hardy enough with some shelter, such as 'Mrs. A. Wery,' 'Palestrina,' *altaclarense* and the *occidentale* hybrids.

*Berberis Darwinii** is one of the most reliable of very wind-hardy shrubs. It is worth getting a good form (or hybrid) such as 'Flame,' which has coral-red buds and maintains a floral beauty for two months besides its handsome foliage and berry. With me this is 10 feet high. Another first-class Berberis is *stenophylla coccinea*,* a compact bush, very fragrant in April. Both these are hot in colour, and look the better for some cream-white (not full yellow) as a neighbour. Hardy Buddleias such as *nanhoensis*,* 'Ile de France,' and the orange *globosa** are tough.

A correspondent at Gisborne, New Zealand, tells me that *B. salvifolius* makes a wind-break up to 20 feet high there.

Many varieties of *Camellia japonica*, such as 'Sylva,' 'Jupiter,' 'Kelvingtonii' and 'Adolphe Audusson,' are much more wind-hardy than is generally realized; others, such as 'Lady Vansittart' and 'Magnoliaeflora,' 'Mathotiana alba' and the plant known here as 'Alba grandiflora' (Sode-Gakushi in Japan and 'Lotus' in America), require full shelter, partly because their flowers are very readily browned. *C. Sasanqua* var. *oleifera* stands a good deal, but the true *C. oleifera*, the species, is very sensitive. Some forms of *C. reticulata* (type) are tougher than others: in some, the soft young shoots suffer in wind. *C. Sasanqua* does well too; the compact free-flowering varieties from Japan are far more rewarding than the old pink and white forms still commonly grown in England. *C. saluenensis* may be rather more exacting about shelter than *C. japonica*, but the hybrids with *japonica*, such as 'J. C. Williams' and 'Elizabeth Rothschild,' are remarkably wind-hardy as well as prolific.

*Caryopteris clandonensis*, and Cistuses such as 'Silver Pink' and *Loretii* can be included; indeed *C. pulverulentus* (*crispus*) survives in severe exposure on the foreshore. *Clematis Armandii* does not like wind, but *C. flammula* stands any amount, and *C. montana* and *Spooneri rosea* are satisfactory. So too are *Convolvulus cneorum*; *Cordyline australis**; *Cornus capitata* and *Kousa*; *Corokia virgata* and others; *Correa virens**†; many Cotoneasters, notably *lactea**, *pannosa*,* *microphylla*,* *horizontalis*,* *conspicua**; Cydonias; various *Cytisus*, including the fragrant *C. racemosus*.†

Wind-hardy Daphnes include *collina*, *retusa*, *japonica* and 'Somerset.' Deutzias stand wind well; *Drimys aromatica* is tough enough to be used as a wind-screen in partly sheltered sites, and I think that noble plant, *D. Winteri* var. *latifolia*, will prove more resistant than typical *Winteri*.

Embothriums are used as hedges in some places in Chile, and *E. longifolium* is worth growing in a windy garden even if the top has to be cut off. *E.* 'Norquinco,' narrow leaved and virtually deciduous, promises to be much more suitable for windy sites than the others. Ericas include, of course, many of the most wind-tolerant of shrubs for the lime-free garden. *E. carnea* thrives even on a calcareous sandy foreshore, and flourishes in the full blast of moorland gales. So do its invaluable hybrids, 'George Rendall' and *darleyensis*. Few wind-stoppers make so good a show as *E. mediterranea superba*; but *E. australis* is less tough. *E. arborea* stands a lot, and so does *E. a. alpina*. *E. codonodes* sows itself by the thousand on bleak railway embankments in Cornwall, but with me it is apt to get blasted by wind. *E. vagans*, in such varieties as 'Mrs. Maxwell,' 'Lyonesse,' and 'St. Keverne,' seems to ask for moorland exposure, and so do the Callunas such as 'Alportii,' 'H. E. Beale' and 'County Wicklow.'

Besides the hedging Escallonias already mentioned, many others are worth growing, including 'Donard Seedling,'* admirable either as an informal hedge or as a loose bush in full exposure, and the compact 'Appleblossom.'* *E. montevidensis*, one of the best of late-flowering shrubs, needs some shelter.

*Eucalyptus coccifera** is exceptionally wind-hardy, but *E. Gunnii*

sometimes blows over for lack of anchorage. Eucryphias are surprisingly tolerant; indeed, *E. cordifolia*† flowers more freely, I think, in an exposed site than in full shelter. *Eupatorium micranthum*†, *Exochorda macrantha*,* and *Euphorbia mellifera*† can be included.

*Feijoa Sellowiana*† will do. *Fuchsia Riccartonii** and *F. gracilis*,* soft though they look, are among the most wind-hardy shrubs we can grow. (Have you seen those hedges of *Riccartonii* on the hills of Kerry ?) *Genista hispanica** thrives in full exposure, even on the foreshore, and *G. cinerea* stands wind well. So does *Grevillea rosmarinifolia*.† *Hippophae rhamnoides** of course. All the Hoherias, especially *H. angustifolia*,* a beautiful plant too seldom seen here. *H.* 'Glory of Amlwch' besides being remarkably wind-hardy, holds its flowers much better than *H. glabrata*. *Holboellia latifolia*† is one of the few wind-hardy climbers, and is very fragrant in flower. Hydrangeas include some maritime plants of extraordinary endurance, notably *H. maritima* (Haworth-Booth) and its round-headed form, 'Joseph Banks'; many of the garden varieties, such as 'Goliath,'* 'Vibraye,'* and 'Lanarth White,'* thrive in more Atlantic wind than common Blackthorn can endure.

*Hymenanthera crassifolia*, with white berries, does well in full seaside exposure. *Hypericum* 'Rowallane Hybrid,' flowering from late June till Christmas in the milder counties, can certainly be used, and others such as *patulum Forrestii*.

One of the toughest shrubs is Holly, including such varieties as *Ilex Hodginsii** and *I. maderensis*.*

Low growing Junipers, of course, have a place: none is tougher than the prostrate form of *J. communis*,* or the robust *J. Pfitzeriana*.*

The toughest Laburnum is *alpinum**: better for a windy site than *Vossii*. *Laurus maderensis*,* with large leaves, conspicuous flowers and the stature of a tree, is a noble Bay, and common Bay, *L. nobilis*, thrives behind some shelter. *Leptospermum ericoides**† is, perhaps, the most wind-hardy of its family, but others, including *L. scoparium Chapmanii* and *Nichollsii*, stand a good deal. *Lomatia ferruginea*, *Lupinus arboreus*,* *Lyonothamnus asplenifolius*†—all these will serve. Some common climbing Honeysuckles are hardly less tough than the native *Lonicera Periclymenum*, which flourishes amongst the rocks of Cornwall's windiest headlands.

Crabs such as *Malus hupehensis* and *Lemoinei* will do, given a good deal of shelter. *Medicago arborea*,* soft as it looks, is extremely wind-resistant. *Metrosideros lucida**† and *M. robusta*,*† suitable only for the mildest gardens, stand the full Atlantic blast. *Myrtus Luma*, the common tree Myrtle, *M. Lechleriana*,*† which flowers in May, and *M. tarentina*,* the small-leaved form of common Myrtle, are excellent.

Many Olearias can be used if frost permits; besides those mentioned already, there are *O. chathamica*,† *Colensoi*,† *Forsteri*,* *lacunosa* and its hybrid with *ilicifolia*, *mollis*,* *scilloniensis*,* *semi-dentata** and the tough but dull *Solandri*.*

*Paulownia* may seem a surprising inclusion, but *P. tomentosa* thrives close to the sea in severe exposure at Carlyon Bay, St. Austell; and I think *P. Fargesii* will do equally well. *Pernettya mucronata**; *Phillyrea**; Pittosporums *Tobira**, *Colensoi*,* *Ralphii*,* and to a lesser degree *tenuifolium*; shrubby Potentillas; some Japanese Cherries, such as 'Tai-Haku,'

'Jonioi,' and 'Hokusai.' Pyracanthas—all these will do. *Pieris taiwanensis* is much easier in a windy garden than *P. Forrestii*, which hates draughts.

Rhododendrons vary a lot in tolerance of wind. Some, such as *ponticum* and 'Purple Splendour,' are among the toughest shrubs we have; others lose their leaves. Many of the mountain species and their hybrids are easy; none more so than 'Blue Tit,' *ledoides*, *impeditum*, *cantabile*, *leucaspis*, 'Bric-a-brac,' *Sargentianum*, *calostrotum*, *oleifolium*. *R. leucaspis*, in moorland exposure, is 6 feet across, but its flowers brown so readily that it proves much less rewarding than its hybrid, 'Bric-a-brac.' *Ciliatum* does well, and 'Cilpinense's' only fault is that it flowers too freely. 'Praecox' and its excellent successor 'Emasculum' are unfailing; so are *mucronulatum*, *tephropeplum* and *deleiense*, *glaucum* and *ravum*. *R. rubiginosum* is notably tough and looks well with the early heaths. Many triflorums thrive, such as *yunnanense*,* *chartophyllum*, *hormophorum*, *Davidsonianum*,* *pseudo-yanthinum*. *Zaleucum* and *Augustinii* are more exacting, but *russautinii* is easy; so are *cinnabarinum Roylei*, 'Lady Rosebery' and 'Lady Chamberlain.' Various scented hybrids such as 'Lady A. Fitzwilliam'† and 'Princess Alice'† succeed notably well, given some shelter and shade. The remarkable wind-tolerance of *R. Maddenii* is indicated by Fig. 163, showing a plant in the writer's windy garden. *R. crassum* is equally tough.

I have had success, in some shelter, with such *Griersonianum* hybrids as 'Fusilier,' 'May Day,' 'Matador,' and 'Vanessa' and with 'Red Cap' and *Barclayi* 'Robert Fox.' 'Earl of Athlone' seems more exacting, and, whilst *sperabile* is easy, *neriiflorum* is very sensitive. Amongst yellows, 'Letty Edwards,' in the form with pink buds, is remarkably resistant; so, I believe, is 'Unique'; but 'Damaris' is wind-tender and so is 'Penjerrick.' 'Loder's White' is reliable with a moderate amount of shelter, but 'Loderi' I have not attempted. Of all these Rhododendrons none are more rewarding, I think, than the pink forms of *Davidsonianum*.

Ribes* is easy. Most of the conventional bedding roses are no good, but some of the species, notably *R. Moyesii*,* are imperturbable: so are *cantabridgensis*, and some *moschata* and *rugosa* hybrids. I think the beautiful 'Nevada' will thrive, given some shelter, and I hope for success with 'Frühlingsgold.'

*Salix daphnoides*,* *Santolina*,* *Skimmia*,* *Sorbus Aria** or *S. A. lutescens*, *Spartium junceum**—all these can be included; also *Sophora microphylla*.

Tamarisk, *e.g. T. pentandra**; *Trachelospermum jasminoides*.† *Tricuspidaria lanceolata*†* is tough enough to be valuable as a fast-growing wind-screen, but not in full exposure.

*Vaccinium Mortinia* is one of the plants that is better in exposure than in shelter. Many of the Veronicas (Hebe) are extremely wind-hardy, including *brachysiphon* (*Traversii*) and *Dieffenbachii*. *Viburnum Carlesii* and its hybrid *Juddii* do well, and so does Laurustinus; but *V. betulifolium* only produces its marvellous show of berries in some shelter; and I have not succeeded with *V. fragrans*.

Weigelas, *Wisteria sinensis*, Yuccas, and the Zenobias conclude this selection.

## THE WIND PROBLEM IN THE COLDER COUNTIES

So far, these notes have dealt with planting in exceptionally windy sites in mild climates—sites where the wind problem is more pressing than anywhere else and where the planter's exceptional repertory of plants most needs review. But, of course, all our windy coasts, whether cold or mild, have special need for shelter planting; and inland, too, most gardeners and farmers have problems of wind shelter and wind tolerance.

As for coastal planting in the colder counties, the list given above includes many plants that are sufficiently frost-hardy to be reliable, and others that are worth trial. I hope it may encourage some planters on those coasts to experiment in this direction; for the list of plants recommended in existing books on coastal planting are, I believe, too restricted, and the planting one sees in seaside gardens is, with rare exceptions, particularly stereotyped and dull. As regards tree-planting, the Forestry Commission's notably successful planting of Culbin Sands in Morayshire should promote confidence in the feasibility of growing such trees as Corsican Pine and *Pinus contorta* in such sites, even on shifting sand dunes. In Jutland, and near Dundee and elsewhere, *P. montana* has proved its outstanding toughness. I hope that if *Olearia albida* has not been included in gardeners' experiments on cold windy coasts, it will be tried.

Inland, if shelter-planting is wanted, it can be provided much more easily than on the coast. The range of trees is ample, there is seldom need for wind-protection of young trees, and the economic problem is much simpler, since shelter trees can commonly be grown to a size useful for timber.

How far, though, is shelter-planting desirable inland? I venture, in conclusion, to refer to a controversy about this which has arisen in an area of high fertility and low rainfall, the Isle of Ely. Thirty years ago there may well have been too many wind-breaks and hedges for economical working of that rich fenland. But during the past thirty years trees and hedges have been eliminated wholesale. (At a public inquiry at Ely about a tree preservation order, three farmers, farming in all 7,000 acres, claimed that they had exterminated every tree from their farms.) The County Planning Committee, on the contrary, holds that more tree planting is required, and that this wholesale slaughter not only makes the countryside unsightly but is producing grave soil erosion. Photographs of the dust-blackened sky and soil-filled dykes in the windy April of 1948 appallingly recall pictures of the American "dust-bowl." It would be impertinent for me to offer a confident opinion on such a controversy. But fertile topsoil is an asset of national importance, which could be squandered through short-sighted policy about wind-control. I hope therefore that the whole situation will be impartially and authoritatively examined, including the question—what trees (e.g. *Populus* 'Eugenei') would best serve as wind-breaks in that area.

Since this was written, the Ministry of Agriculture has published Leaflet No. 15, "Shelter Belts for Farmland," which includes useful notes on the wind-tolerance of seventeen trees.

# DELPHINIUMS AND THEIR CULTIVATION

*Allan Langdon*

(*Lecture given on June 26, 1951*; MR. G. W. LEAK, V.M.H., *in the Chair*)

IT is commonplace but nevertheless true to say that the surest guide to the successful cultivation of any genus in the vegetable kingdom is the closest possible emulation of the prevailing conditions in its natural habitat. Where then must we travel to study the needs of Delphiniums? Almost without exception the numerous species—and there are several hundred of them—are found in countries which possess regions, at varying altitudes, in which for some time in the year the ground is frozen and covered with snow. Some of the species are annuals, some biennials, and others are perennials. Their colours vary from dark and light blue to scarlet and even yellow. The majority of the wild species do not take kindly to cultivation in Europe and this applies particularly to Great Britain, mainly I feel because of the great variation in temperature during our winter months. Most of them would probably survive if they could be assured of being frozen for at least four months of their resting season. This tendency to non-survival has limited their usefulness and they have little value except as botanical specimens. Even as parents they are unco-operative apart from one or two notable exceptions. Fortunately, little of garden value has been lost as most of them are insignificant in appearance, though I should be very happy if I could successfully infuse the scent of *Delphinium Welbeyi* into our modern types.

It is generally conceded that the species from which the present-day hybrids have evolved was *D. elatum* and that *D. exaltatum* also played its part though no accurate genetical record is available to indicate the degree of use made of these species. Suffice it to say that these particular species have their origin in countries where the plants have to contend with very severe cold during the winter months but are immune from the frequent and violent fluctuations of temperature so common in Great Britain. For instance, *D. elatum* is recorded as having originated in the Swiss Alps, while *D. exaltatum* thrives in the even colder regions of North America. In broad principle therefore we are forced to the conclusion that the hybrid Delphinium which we grow must be classed as a hardy plant, and incidentally I fervently hope that this most desirable trait together with its perennialism will be maintained.

Having as I hope established the hardiness of the Delphinium, I shall turn to a consideration of the kinds of soil in which it will grow satisfactorily, and in this respect we have a far greater scope for choice. My experience has taught me that by far the best medium is a rich, deep and fairly heavy loam, and that an admixture of clay, provided it is not one of the oolite group, should not be scorned. The least suitable kind is a dry, very sandy soil, particularly when it covers a gravel subsoil. I think the main reason for the unsuitability of this kind of soil is that by its nature it dries out very quickly during the summer months and a moist soil during this period is a *sine qua non* of good plants and flowers. Newly planted Delphiniums will probably get away more

quickly in a sandy soil than they would do in a heavy loam, but those in the heavy loam will eventually make much the better plants.

I should like to tell you of my experience in planting Delphiniums for show purposes during the past 12 months. No one will readily forget the appalling wet summer we had last year which was followed by an equally wet and terribly cold winter and spring. Our plants were ready for planting out in April but the land which was to receive them was almost water-logged, and while I would have preferred to defer planting in the hope of more favourable conditions, circumstances demanded that the job should be completed as quickly as possible, so in they went. Neither the planters nor I were happy about the operation and throughout the wet summer and autumn we had qualms as to their survival through the winter to the spring. The ground was so continuously wet that little if any weeding was possible. We knew the land was slug-ridden so we guarded against their depredations by covering the crown of each plant with a liberal dressing of sharp ashes and hoped for the best. I freely admit that on many occasions during the winter I pictured that plantation in the spring with just an odd plant showing here and there, and with the majority having completely succumbed to the inhospitable conditions. Imagine, therefore, my delight and surprise when spring arrived with the land still in a thoroughly sodden condition, to find that almost every plant of those several thousands had survived and were producing shoots equal, if not superior, to any I have ever seen. After such an experience I am sure I shall be excused if I feel confirmed in my previous conviction that a heavy moist soil is the best kind for Delphiniums (Fig. 167).

Nevertheless, this does not mean that they cannot be grown successfully in soils having totally different textures, but whatever type of soil is to receive them, it should be deeply dug and brought to as fine a tilth as possible. The lighter soils will greatly benefit from fairly heavy dressings of humus in some form or other, while the very heavy soils can be made more suitable by adding sand or grit of some kind. The optimum acidity range has not been determined, but observations show that Delphiniums do not like an excessively acid soil, so as a general rule it is safe to add lime before planting. The amount depends on the degree of acidity, but a dressing at the rate of 2 oz. per square yard can be added to most soils with advantage.

Many garden soils are deficient in phosphates and the light sandy soils will probably lack potash also. Phosphate in the form of bone meal at the rate of 6 oz. to the square yard, or superphosphate at 4 oz. to the square yard, should be added; while the best way to increase the potash content is to apply it as sulphate of potash at 2 oz. to the square yard. It must always be remembered that plant foods are leached more readily through a sandy soil than through a heavy one, which means that manures can be more freely applied to the lighter kinds of soils than to heavy loams. If the latter are too heavily manured with nitrogen and phosphates, coarse unbalanced growth will result.

The answer to the old query as to when to plant Delphiniums is as difficult to give as it is to name the best variety, but as a general guide it is best to plant in the spring on heavy land and in the autumn on the

lighter soils, but it should be early autumn and not later than the end of September, except in a particularly open season. I would like here, if I may, to express my confirmed belief that amateurs, particularly, would do well to break with the traditional planting seasons and where possible plant as early as June or July. The plants would certainly not be so large at that time of the year but the soil is warmer and that would encourage immediate root action. The plants would also become established before the winter sets in and would therefore produce much better flowers the following summer than those left until autumn or spring, in fact there is no reason why they should not have fully developed spikes the first year, which is extremely unlikely from the autumn or spring plantings. Those to whom I have recommended this method never return to the conventional seasons. The one stipulation I make in adopting this practice is that the plants must not suffer from lack of water at the roots. I may say that my young plants are already in their final places for next year's flowering.

I want now to pass to the three methods of propagating Delphiniums; that is, from seed, by division and by cuttings.

I suppose the most common, and undoubtedly the quickest, is Nature's method—by seed. It must be remembered however that the hybrid Delphinium does not breed true to type and the only methods of perpetuating any desired variety are by cuttings and divisions. Nevertheless, growing Delphiniums from seed can be a most interesting and fascinating occupation.

Delphinium seeds do not maintain their viability for very long unless stored in sealed containers in a very cool temperature. In this condition their germinating power can be maintained for a year or so, but should they be stored in a dry, warm room, their vitality is quickly lost. It follows, therefore, that unless these special storage conditions are available, the sooner the seeds are sown after gathering the better, and if this practice is followed, mature seeds should have a germination of 80–90 per cent.

Some growers advocate making their autumn sowing in the open ground but I prefer to use shallow boxes where the seedlings can be more easily tended. A not too heavy soil should be used and the seeds can be sown either in shallow drills or broadcast, but in any case they should be covered with about half an inch of fine soil or sand. The boxes are best placed in a cold frame with shaded glass. As soon as the third leaves appear, the seedlings should be transplanted into other boxes giving them not less than 3 inches between each plant and as soon as they are established they must be given full light and air, when they will quickly make strong plants. As the days shorten and become cooler, growth will gradually cease, and eventually most, if not all, of the foliage will turn yellow and decay. This is a perfectly natural procedure and need not cause alarm as the crowns of the plants will remain intact and healthy. During very wet weather the frame lights should be replaced as an excessively wet and cold soil over a long period may cause losses. Frosts on the other hand need provoke no qualms whatsoever, particularly if the soil is reasonably dry, but I must here put in a severe warning against the damage caused by slugs and snails. Every precaution must be

taken against them or the entire stock may be lost in a night. With the lengthening days in March and April, the dormant crowns will burst into growth, and as soon as weather conditions permit they can be planted in their permanent positions for flowering, and during August and September they will produce good sized spikes but they will not be seen in their full glory until subsequent years.

Sowings in January, February and March will of course have to be made in a greenhouse and if possible in a temperature of about 55° F. The method of sowing and transplanting will be the same as I have already described for autumn sowing, except that when transplanted the seedlings should be kept in a genial temperature until they are well rooted and ready for hardening in a cold frame.

Increasing stock by division is a method which has a large following and is generally used for plants which have been established a number of years and when it is thought that a change of soil and site may be beneficial, but personally I hold the view that no matter how long a plant has been in the one place, provided it is healthy and growing well, it is best left alone unless it is necessary to lift it for the sole purpose of increasing stock. If this has to be done there is no doubt whatever that the best time to lift and divide Delphiniums is the spring when they have several inches of growth. It is then easy to select pieces of the old plant each of which has one or two shoots and a satisfactory portion of the old roots. Very old plants tend to have a hollow area in the centre of the clump. No part of this should be transplanted if it can be avoided as it may predispose the small sections to rotting. Growing crowns taken from the circumference of the old plants are undoubtedly the best.

Most commercial growers and many amateurs increase their stocks of selected seedlings and named varieties by cuttings, which is the quickest and best method. Cuttings are the young growths which arise from the crowns of the plants in early spring. They are severed from the parent plant when about 3 inches long by first removing the soil from around the plant and then cutting off the growths as close to the main stool as possible, making sure that every one has a heel. Hollow-stemmed cuttings are quite useless and should be discarded. Sound cuttings should be inserted either in sand or sandy soil in pots or boxes, and placed in a frame which is kept closed and shaded. They should root in three to four weeks and as soon as they have made roots an inch or so long they can be potted into 3-inch or 4-inch pots, and about May they should be ready to plant in the open ground where they are to flower. It is best to pinch out the tip of the growing shoot which will encourage new eyes to form at the base of the cutting and these will probably provide flowers in the autumn. The spikes will naturally be small but, nevertheless, useful. The following year, however, they will produce fully developed plants and flowers.

Correct staking and tying are very necessary and important phases of Delphinium culture. It must be started when the shoots are a foot high and continued as growth progresses. If one has the necessary time and patience it is a good plan to tie each spike to a separate cane but I shall assume that few growers are in that happy position to-day, and there are certainly none among commercial growers.

The alternative method is to place three stakes triangularly around each clump and encircle it with raffia or fillis tied to each stake. This allows the plants to sway safely with the prevailing wind within the limits of the stakes which should not be too high and should be placed as unobtrusively as possible.

The number of spikes which should be allowed to develop on each plant is a perennial question and it can only be answered by saying it depends upon the variety and vigour of the plants. In general terms, it is safe to say that newly planted Delphiniums should have no more than two, but those which have become established can be allowed as many as four to six. If reduction is necessary, the thinnest stems would, obviously, be removed and they must be cut out as soon as their size and number can be determined, which is normally when they are about a foot high. Whilst on the subject of thinning I should mention the equally controversial subject of disbudding, by which I mean the removal of the laterals or side growths. Whether or not these should be taken out depends entirely upon the purpose for which the plants are being grown. The accepted practice to-day amongst exhibitors is the complete removal of all of them. Whether this is wise is open to debate, but the practice definitely enhances the size of the main centre spikes and for that reason alone it is probably excusable. But the grower who has the decoration of his garden as his chief object is strongly advised against this mutilative practice as the retention of the laterals will considerably prolong the period during which the plants will flower; furthermore, these side growths or laterals are most useful as cut flowers and in my opinion have greater decorative value than the larger centre spikes.

A word or two on feeding Delphiniums will perhaps not be amiss. In the main they are hungry creatures, and will repay good cultivation which entails the discretional use of fertilizers. It is impossible to suggest a routine of feeding which could be applied with equal accuracy to every condition and environment, but it is fairly safe to assume that all Delphiniums will benefit from an application of a compounded soluble fertilizer when they are about 6 inches high. I, personally, favour one liberal dressing in March and that is the full extent of the feeding which my Delphiniums receive.

The fertilizer I use has an analysis of 15 per cent. nitrogen, 20 per cent. soluble phosphoric acid and 5 per cent. potash. This is distributed at the rate of 2–4 oz. per square yard and I find it sufficient to carry the plants through until they have finished flowering. I think it unwise to have much unexpended artificial manures in the soil once the plants have concluded their allotted task of producing flowers. Remnants of the potash would not matter, but an excess of nitrogen or phosphates might soften the plants to such an extent as to predispose them to rotting during the winter, and, furthermore, would almost certainly invite autumn mildew should any of the varieties be susceptible to it.

I suppose I need hardly mention that on the lighter soils especially a good mulching of well-rotted manure, or some other form of humus, is most helpful in retaining moisture around the roots during their flowering season, and at the same time provides a modicum of sustenance; but whichever form of feeding is used I must repeat my warning

against an excess of nitrogen, especially of the easily assimilated kinds such as sulphate of ammonia and nitrate of soda, or unbalanced plants will result and it will be almost impossible to get well-formed flowers.

The treatment of the plants when they have finished flowering often causes some concern, but it need not do so as the procedure is a perfectly natural one. When the last petals have fallen the spikes should be cut down to the uppermost leaves which will, or at least should be, still green and vigorous. The plants will remain in this condition for quite a while, but when eventually the leaves and stalks turn brown and begin to decay, all the growth can be removed to within a foot of the ground, in which state they will remain for the winter. It is usually possible to do this in October, which is also a good time to cover the crowns with ashes after first removing some of the soil. Protection against that greatest of all garden menaces, the slug, is often left until much damage has been done, so the sooner the crowns are covered the better. I am quite certain that more losses and disappointments are caused through failure to take this elementary precaution than from any other source, and it is impossible to overemphasize its necessity.

Before passing from the post-flowering period, I should mention that if it is intended to save seed it is advisable to select about half a dozen pods on a spike and remove the remainder as seed-bearing weakens the plants and should not be allowed to proceed uncontrolled.

I had thought of making reference to the relative merits of some of the latest named varieties, but have decided against doing so as the choice is so much a matter of personal opinion, and practically every variety in commerce has individual characteristics which will commend it to someone. I would, however, like to make a few brief remarks on the modern trends in raising new varieties. Among the most important I place immunity, or rather resistance, to mildew. Delphiniums are subject to few diseases, but most growers have experienced the unsightly effects of powdery mildew which attacks certain varieties towards the end of their flowering season and through the autumn months. Not only does mildew spoil the appearance of the plants, but I am certain it weakens them constitutionally and may be the indirect cause of a proportion of winter losses. It is well known that some varieties are more susceptible to it than others, and it is to the complete elimination of these highly susceptible varieties that our cross-breeding is largely directed. I place resistance to mildew and perenniality as the two most essential characteristics that Delphiniums should possess—even before colour. A certain amount of criticism has been levelled at many of the modern Delphiniums on account of their size. Now I have no use for size alone but I see no reason why Delphiniums should not be as tall as lamp posts, provided they are not disproportionate, for after all, who does not admire the stature of *Lilium giganteum*? I think there is room for varieties of all sizes and forms and no one would convince me of the wisdom to concentrate on any one particular size or form. I admire greatly the giant types, but I have considerable affection for those smaller, thin-stemmed graceful spikes which, after all, are probably more useful to the non-exhibitor than the giant sorts. An example of the kind of plant I have in mind is the variety 'Monaveen.' Its length of flower-spike is

rarely more than 2 feet and the stems are not more than ½ inch in diameter. It is resistant to mildew, and its petals are retained on the basal flowers until the whole spike is fully out, while the colour is a most delightful pale blue self. As a garden plant it is ideal and I think I would choose it in preference to the most majestic exhibition variety ever raised. Incidentally, it would probably prove quite useless on the exhibition table. I mention this as I want to assure you that we raisers are not breeding for the exclusion of the more decorative graceful plants and it would, indeed, be most unwise to do so because the proportion of amateur growers who grow Delphiniums just for exhibition to those who use them solely for garden decoration, is infinitesimal.

You would not expect me to conclude without making reference to the recently introduced American strain of Delphiniums with which many of us are acquainted.

The raiser of this strain most generously sent me a collection of seeds of all his varieties in 1949, and they provided me with great pleasure and interest when they flowered in the autumn of 1950. Among them were some very lovely plants and many of their colours were quite attractive. Records were kept of the numbers of each variety planted as I was anxious to test their perenniality. I had previously tested other American strains, chiefly of the white-flowered kinds, and I was driven to the conclusion that it was well-nigh impossible to perpetuate any of them by vegetative propagation. My qualms on this particular characteristic of the new American strain were, unfortunately, justified, for during May of this year I found that only 36 per cent. of them had survived the first winter in a fairly healthy condition, while 89 per cent. of our own, which were growing alongside, came through in a comparable state of vigour. I must explain that the Americans have a totally different object in view from ours when cross-breeding. Speaking generally, they have long since discontinued the practice of vegetative propagation because they found that their climatic conditions did not favour survival over a number of years, whether they were propagated plants or seedlings, and as it is much easier to raise from seed they naturally worked to that end and, I may say, have done it quite successfully. The raiser himself has said that perennialism to him is of little importance. It is quite possible, of course, that a small percentage of plants from this American strain may live for a number of years, and indeed I have heard of some which have done so, but the strain cannot be classed as having a true perennial habit; of that I am completely convinced. Nevertheless, there is no reason why it should not fill a very useful niche in our floral catalogues provided any possibility of confusion with the true perennial kind is avoided.

In case you should think I am prejudiced against the American Delphiniums, I want to read you a paragraph from the American Delphinium Society's Year Book for 1950 written by one of the most eminent European hardy plant specialists, DR. RUYS of Dedemsvaart. This is what he wrote:—"It is a pity that most U.S.A. Delphiniums, chiefly annuals as they are, however beautiful the various strains may be, are more or less valueless for the European growers of Hardy perennials . . . since longevity is a necessity where perennials are con-

cerned." Also in the same Year Book is a letter from the Garden Supervisor of the Cleveland, Ohio, Board of Education, in which he wrote:—"My experience has been that the Pacific Hybrids are rather short-lived but probably they are good enough to be considered as biennials and planted every year for one grand show."

The Delphinium is surely the most valuable hardy herbaceous plant we have and I think an irreparable disservice to horticulture would occur should it lose its perennial nature and I, together with those associated with me, will not cease in our endeavours to ensure that this characteristic is kept inviolate.

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# BUD BLAST DISEASE OF THE RHODODENDRON
## in its relation to the leaf-hopper *Graphocephala coccinea* Forst.

*A. F. H. Baillie and W. F. Jepson*

IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY, FIELD STATION, SILWOOD PARK, SUNNINGHILL

## INTRODUCTION

ALTHOUGH the Rhododendron is often regarded as a plant for the specialist, the number of its devotees is increasing rapidly with the years. The introduction and development of species and hybrids of striking variety both in colour and habit will cater for almost every taste. It is all the more regrettable, therefore, that the disease known as "bud blast" is marring to an ever greater extent the pleasure of cultivating the Rhododendron in this country. The disease is becoming a matter of some concern to commercial growers, who have been developing a flourishing export of new hybrids to the U.S.A.

We may first of all define "bud blast" as an annual cycle of deterioration of the flower buds. Beginning in the late autumn, brown patches appear on the outer bud scales extending by December to the whole surface of the bud, and inwardly to the vascular system, which becomes blocked. The whole bud then dies, and after a variable period of weeks or months, according to conditions, black whisker-like outgrowths cover the surface of the bud. The individual hairs are knobbed, and are in fact the sporulating bodies (coremia) of a fungus, *Pycnosteanus* (*Sporocybe*) *azaleae* (Fig. 175). Growth buds are affected to a lesser extent, but in a bad attack they may suffer a severe percentage of loss. The disease only rarely extends to the stem below the bud. A short account of bud blast is given by DODGE & RICKETT.

Little is known of the pathology of the fungus, but the disease has been recognized for many years in America on Azalea (W. H. DAVIS, 1940), and its dissemination is regarded as being wind-borne by spores

liberated from the coremia. There appears to be no perfect fruiting stage of the fungus, neither has any association with the leaf-hopper been suggested.

In England, particularly in the sandy Rhododendron areas of Ascot, Bagshot and Woking, the recent severe incidence of bud blast has been marked by a contemporary increase in numbers of the large green and red leaf-hopper, *Graphocephala coccinea* Forst. (Hemiptera-Homoptera, family Jassidae.) This species was evidently imported from North America during the early 1930's and an account of its habits in the country of origin was published by FOX-WILSON in the JOURNAL of The Royal Horticultural Society for 1937.

Details of how far the disease extends from this area are not known, but it apparently does not yet occur to any extent in the West of England Rhododendron gardens. The Orchard Neville Nurseries, Ltd., Baltonsborough, Somerset, have "investigated carefully, but can find no trace of either bud blast or the leaf-hopper." And the Bodnant Gardens, North Wales, are clear of both bud blast and leaf-hopper.

CAPTAIN MAITLAND DOUGALL examined, in Inverness-shire, "two large gardens some miles apart in the Fort Augustus neighbourhood." He found no trace of bud blast, *S. azaleae*, nor leaf-hopper. Nor could he find any infection on semi-wild Ponticums in the woods.

Research work at the Imperial College Field Station, Silwood Park (Morcos, 1948), has shown that this leaf-hopper lays its eggs in scars rasped in the lower scales of the flower buds by means of a sword-like ovipositor. If therefore the fungus is a wound parasite, the increase in bud lesions caused by a heavy population of leaf-hopper might well be correlated with a high incidence of bud blast disease.

The experimental work necessary to establish the transmission of plant disease is notoriously long and arduous and would demand the full time attention of a plant pathologist and probably also of an entomologist. Alternatively, we may test the hypothesis of an association between insect and disease and also attempt diagnosis by control. If we control the insect, and thereby lessen the disease, we may deduce a close degree of relationship between the two organisms.

The opportunity has arisen for a study of the leaf-hopper in the hibernating egg stage in its relation to a number of species and hybrids which exhibited differing degrees of susceptibility to bud blast. Factors such as position, shape, size, stickiness and hairiness of buds have all been considered. This study, made by one of us (A. F. H. B.), was supplemented by field observations over two seasons of the history of bud blast incidence in a number of salient cases. The life-history of the insect in field conditions has been worked out. Preliminary field tests of a fungicide and an insecticide for the control of the disease have been made in observation plots.

The work was made possible through access so freely given by the owners to the nearby collections at Tower Court, Ascot (the late MR. J. B. STEVENSON); Lynwood, Woking (CAPT. MAITLAND DOUGALL, R.N.), and Westbourn, Wentworth (MR. DOBBS).

It must be stressed throughout that many of the conclusions drawn at this stage are tentative, many are even hypothetical. Their

confirmation or rejection can best be assured in partnership with Rhododendron enthusiasts, whose constant and critical observation of the disease in their own collections are of the utmost value to the research scientist, at this early stage of the investigation.

*Life History of Graphocephala coccinea* Forst.

A knowledge of the life-history of the insect in the field must be imparted, in order that weak spots in its armour may be sought. The known facts are tabulated below in chronological order:

APRIL–MAY—*Hatching of eggs.* Eggs on buds become swollen and yellow and hatch earlier or later according to season. First hatchings were recorded as follows:

| | |
|---|---|
| 1949 . . . . . | May 1 |
| 1950 . . . . . | May 4 |
| 1951 . . . . . | May 31 |

MAY–JUNE—*Nymphs.* There are four nymphal stages. The nymph is yellowish or greenish, does not hop, but runs rapidly over the under surfaces of current year's foliage upon which it feeds, sucking the sap by means of the suctorial proboscis.

JULY—*Adults.* In 1950 at Wentworth, Surrey, the first adult leafhopper was observed on July 15. About $\frac{1}{2}$–$\frac{5}{8}$ inch in length, the insect is bright green with two red lateral stripes. *Graphocephala* adults are very active in sunny weather, and they feed at the veins of old and new foliage indifferently, often remaining stationary for several hours, and shooting out at frequent intervals drops of clear fluid. They seldom feed at the buds, and generally their feeding punctures cause no visible damage to the plant.

AUGUST–OCTOBER—*Eggs.* Sexual maturation appears to be slow, and mating and egg laying do not start for 2–3 weeks after emergence. The first eggs were noticed on August 5 in 1950, but they may well have been laid several days earlier. The female selects a firm bud scale and inserts each egg into a shallow scar, usually well protected by the overlapping scale. Groups of 5–10 eggs are commonly laid in a fan-shaped sequence, but single eggs are common and many are visible from without, as the flower bud expands during its development. The average number of eggs per bud on *R. ponticum* was about 28 in 1949–50, and 18 in 1950–51, the difference probably having little significance, as distribution is irregular (a Poisson or J distribution), and standard error of sampling high.

NOVEMBER–MAY—*Hibernation of eggs.* Eggs overwinter on the buds, and where death of the bud occurs, caused by bud-blast disease, they do not hatch, but desiccate with the bud. On early-flowering hybrids such as *R.* 'Loderi White Diamond,' eggs on the outer scales also perish. Such earliness of habit would not appear to affect the general incidence of blast, since invasion by the adult insect from the ever-present reservoir in *R. ponticum* normally occurs late in the year in most Rhododendron growing districts.

*Field Assessment of the disease*

To facilitate assessment of bud-blast incidence, especially in the earlier part of the year (January) a set of five arbitrary grades was used. These are as follows:

GRADE 0. Apparently healthy and no apparent signs of blast.

GRADE 1. Bud with patches of dead brown scale tissue covering less than one-half of the bud, *i.e.* at this stage the brown tissue is usually only on the three or four outer whorls of scales, frequently coinciding with the egg distribution.

GRADE 2. Bud with dead brown patches covering more than half the bud, and disease now extending to heart of bud.

GRADE 3. Bud completely brown throughout. A few coremia visible.

GRADE 4. Bud quite dry and covered with black coremia externally. This grade is characteristic of previous years' infections, but may develop within three months of first infection.

These grades were used in conjunction with egg counts. For example, six buds were taken at random from a bush of *R.* 'Fastuosum flore-pleno' at Tower Court and examined with the following result:

22, 10 (1), 22 (1), 26, 34, 16.

The egg number is followed by the infection grade in brackets, except for healthy buds (Grade 0) where it is omitted.

There is a considerable mortality of leaf-hopper eggs on buds which develop bud blast during the winter. The eggs are, however, still recognizable by their outlines. In Grade 4 infections, the mortality is 100 per cent. while at the other extreme, in Grade 1 buds, it is negligible.

Grade 4 buds commonly remain on the plant for two or three years, and we have recorded up to six generations of blasted buds on the same branch. Infection rarely extends to the wood below the bud, and then only for ½ to 1 inch.

*Susceptibility to Bud Blast*

The differential susceptibility to bud blast of the species and hybrids of Rhododendron is well seen in large collections such as at Tower Court, Ascot. Here, perfectly healthy bushes of *R.* 'Polar Bear,' and many of the species grow amongst heavily infected varieties. This may be due to inherent physiological differences, but some further elucidation is obviously needed, especially as the fungus is insect or wind-borne.

In our experience, hybrids appear more susceptible to bud blast than species, although some species, ***e.g.*** ***R. Souliei***, are often badly infected.

The following Rhododendrons examined at Tower Court, Ascot, were 100 per cent. free of bud blast during the winter of 1949–50: ***R. diaprepes***, ***R. auriculatum***, ***R. artosquameum***, ***R. Griersonianum***, *R.* 'Argosy,' *R.* 'Polar Bear'—these also had no *G. coccinea* eggs. Free of bud blast but infected with *G. coccinea* eggs:—*R.* 'Queen Souriya' and ***R. oreodoxa***. Also at Titness Park with their hairy buds and leaves *R. Falconeri* and *R. fictolacteum*—both free of eggs and blast. *R.*

*Photos. Studio St. Ives*

FIG. 160—*Olearia macrodonta major* in full exposure at Eagles' Nest, Zennor (See p. 343)

WIND-SHELTER AND WIND-TOLERANCE

FIG. 161—*Senecio rotundifolius* at Eagles' Nest, Zennor (See p. 342)

## WIND-SHELTER AND WIND-TOLERANCE

FIG. 162—*Senecio rotundifolius* (right) and *Olearia macrodonta major* (left), at Eagles' Nest, Zennor

*Photo, Studio St. Ives*

WIND-SHELTER AND WIND-TOLERANCE

FIG. 163 — *Rhododendron Maddenii* at Eagles' Nest, Zennor (See p. 346)

*Photo, Studio, St. Ives*

FIG. 164—*Olearia albida* in full exposure (See p. 343)

WIND-SHELTER AND WIND-TOLERANCE

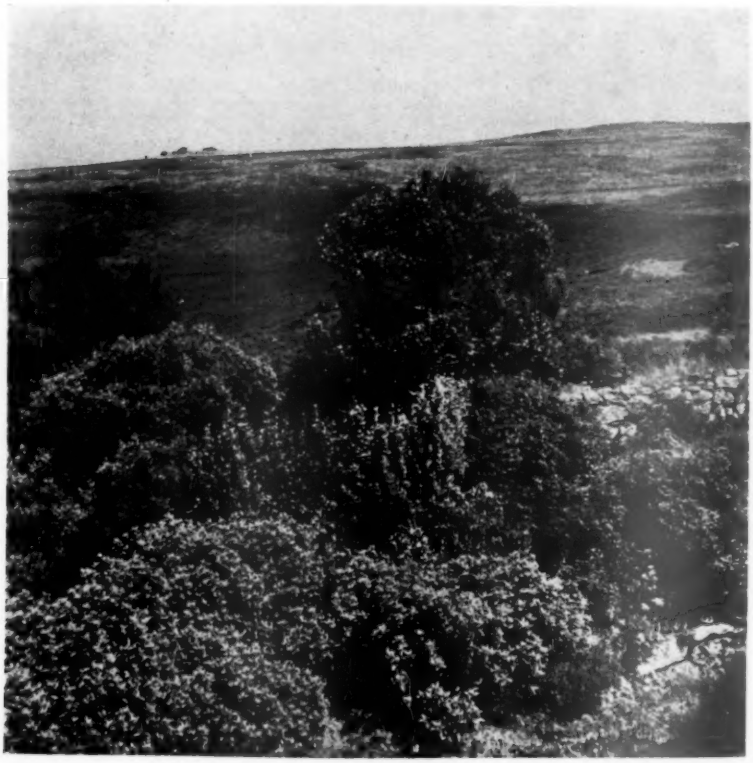


FIG. 165—*Olearia Traversii* on moorland (See p. 342)

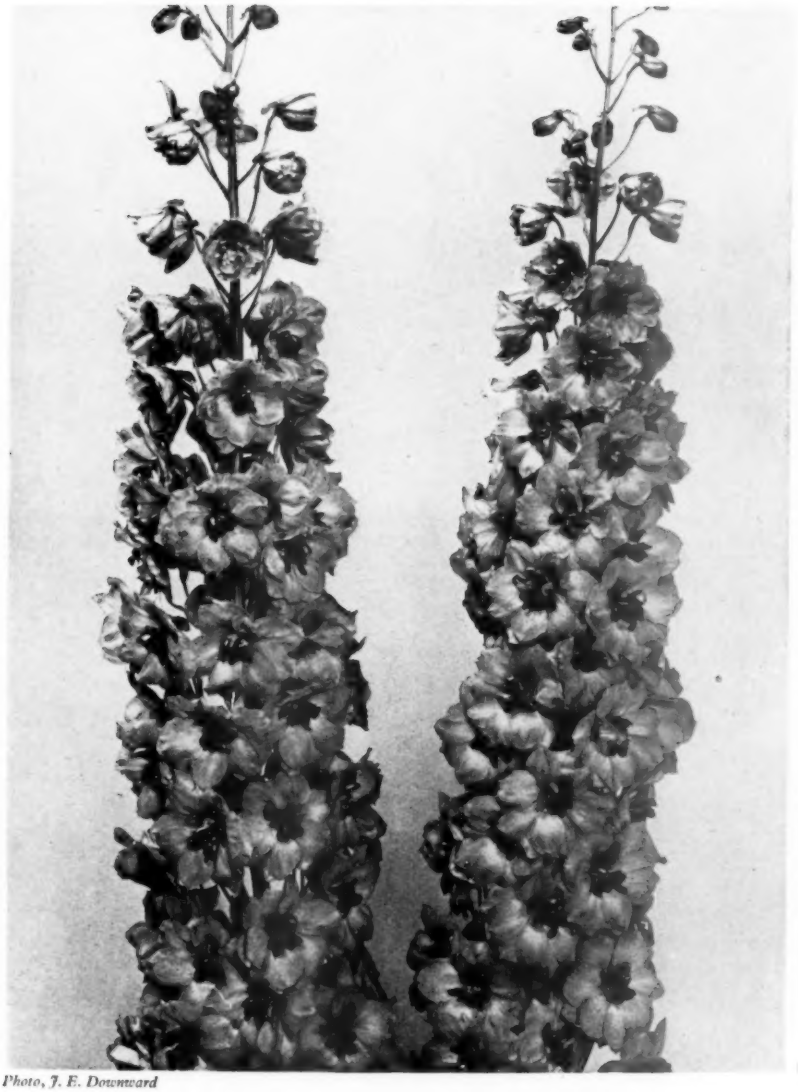
*Photo, Hertfordshire Mercury*

FIG. 166—*Rosa Hugonis*. A very fine standard grown by COLONEL ALEXANDER GREG in Hertfordshire. Stem 3 ft. 6 in., head 9 ft. left to right, 8½ ft. front to back, with a thickness of 3 ft. 9 in. of "umbrella" top. This fine rose, which is a native of China, was introduced to Europe by the missionary PÈRE HUGO in 1847.

*Photo, West Advertising Ltd.*

DELPHINIUMS AND THEIR CULTIVATION

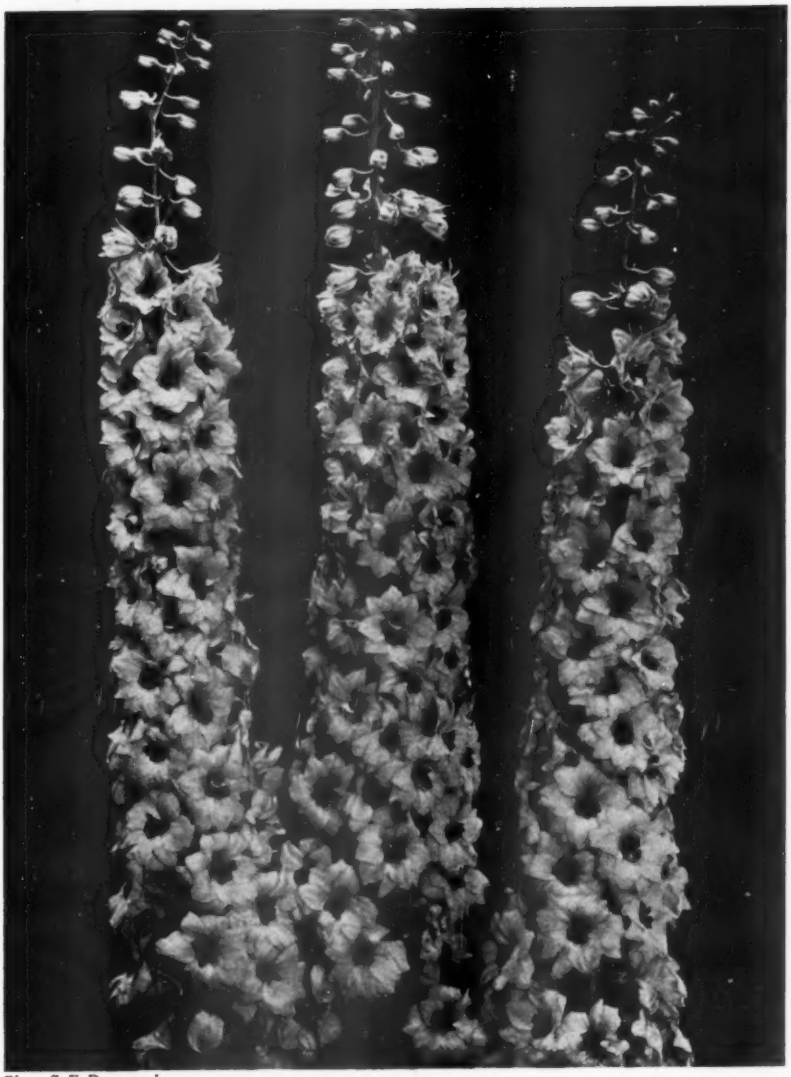
FIG. 167—Two-year-old plants of Delphiniums (See p. 349)



*Photo, J. E. Downward*

DELPHINIUMS AND THEIR CULTIVATION

FIG. 168—*Delphinium* 'Fred Yule'



*Photo, J. E. Downward*

DELPHINIUMS AND THEIR CULTIVATION

FIG. 169—*Delphinium* ' Dame Myra Curtis '

*Photo, West Advertising Ltd.*



FIG. 170—*Delphinium* 'W. B. Cranfield,' 8 ft. 6 in. high. This Delphinium is dark blue and mauve

*Photo, West Advertising Ltd.*



FIG. 171—*Delphinium* 'Jennifer Langdon,' pale blue and mauve. The plant in foreground has six spikes

FIG. 172—*Nerine sarniensis*. Diploid $2n = 22$ (See p. 366)

THE CHROMOSOME HISTORY OF CULTIVATED NERINES

FIG. 173—*Nerine* 'Alice' the mother of 'Inchmery Kate.' $2n = 36$ (See p. 370)

THE CHROMOSOME NUMBERS IN HYBRID NERINES

FIG. 174 — *Nerine* 'Inchmery Kate.' $2n = 44$. **A.M.** October 18, 1949 (See p. 366)

BUD BLAST DISEASE OF THE RHODODENDRON

FIG. 175—Coremia of *Sporocybe azaleae* on bud of *R.* 'Doncaster' (See p. 355)

FIG. 176—*Cryptomeria japonica* var. *spiralis* at Fota, Eire (See p. 376)

*Photo, Rev. F. M. Browne, S.J.*

FIG. 177—*Erica australis* (See p. 377)

*discolor* also appears to be blast-free, although we have not investigated its egg population.

*Egg counts*

A preliminary count of eggs of *G. coccinea* was made on *R. ponticum* at Silwood Park in order to find out how they were distributed on the bushes. Analysis of variance of the figures obtained by random sampling showed that egg laying tends to be concentrated on certain bushes, on the south side of bushes, and on their lower portions (up to 4 feet). The distribution of eggs on individual bushes in high infestations (20–50 eggs per bud) is fairly normal.

When eggs were counted on different varieties, at Tower Court, Ascot, large population differences were noted, as shown in Table I (p. 360).

It would thus appear, that for the varieties chosen, representing a fair cross-section of the series in common cultivation, there is a decided preference by the Jassid for buds of medium size. It is evident also from the considerable deviation in egg numbers between the different varieties, that some other factors must be operating.

Counts were then made of egg numbers on Rhododendrons whose flower buds showed contrasting characters such as stickiness, hairiness, adpression of bud scales, colour, etc. The wide deviations found in the resulting figures made it impossible to conclude that any of these factors affected egg laying.

One would expect more eggs on drier buds, but in the varieties examined the reverse is true. In extremely sticky buds like *R.* 'Queen Souriya' and *R.* 'Loderi White Diamond,' it was noticed that in addition to a low, mean egg count, most of the eggs were exposed on the outermost scales. In *R.* 'Loderi White Diamond' the buds were so sticky that they were trapping numerous small Diptera in the spring of 1950 before unfolding. It is not known by the writers whether these buds were as sticky when oviposition took place in the previous autumn.

*Effect of Early Flowering on the Hatching of Eggs*

It was observed in the hybrid *R.* 'Dr. Stocker' that the outer scales were shed before hatching took place. The following observations tend to confirm that eggs thus shed do not hatch. Two opening buds of *R.* 'Scarlet O'Hara' and one of *R.* 'Geoffrey Millais' were enclosed in muslin sleeves on April 20, 1950, at Titness Park, Sunninghill (J. H. HORLICK, Esq.). These were examined on May 17. The detached bud scales in the sleeves had desiccated together with the eggs. No nymphs were found on these bushes after a careful examination. On April 20, a bush of *R.* 'Dairy Maid' in full bloom was examined at Titness Park. All the scales containing the eggs had dropped off and were lying on the ground below the bush. Scales with forty to fifty eggs in them were collected and kept in a glass jar, with a muslin cover, on dampish soil and left in the open under natural conditions. None of these hatched. On May 17, eggs from scales collected from beneath this bush were examined under the binocular. They showed full or almost full pre-hatching development, but no hatching had taken place and they were considerably shrivelled and desiccated—though less so than those in

## TABLE I

| Large buds (more than 35 mm. long) | | | | | | |
|---|---|---|---|---|---|---|
| Species or hybrid . | ' Polar Bear' | 'Argosy' | *diaprepes* | *sutchuenense* | *Griersonianum* | *auriculatum* |
| Bud size (mm.) . | 50 × 26 | 39 × 18 | 38 × 21 | 58 × 34 | 44 × 10 | 68 × 24 |
| Egg numbers and mean . . | 0, 0, 0, 0, 0, 0<br>0 | 0, 0, 1, 0, 0, 0<br>0·16 | 0, 0, 0, 0, 0, 0<br>0 | 1, 0, 0, 3, 1, 1<br>1 | 0, 0, 0, 0, 0, 0<br>0 | 0, 0, 0, 0, 0, 0<br>0 |
| Grand mean of egg numbers . . | 0·19 | | | | | |
| **Medium buds (15–35 mm. long)** | | | | | | |
| Species or hybrid . | *oreodoxa* | 'Bagshot Ruby' | 'Doncaster' | 'Lady Primrose' | 'G. A. Sims' | *Beanianum* |
| Bud size (mm.) . | 20 × 13 | 34 × 15 | 22 × 14 | 22 × 15 | 23 × 12·5 | 19 × 14 |
| Egg numbers and mean . . | 8, 1, 21, 13, 12, 2<br>9·50 | 52, 52, 47, 44, 45, 52<br>48·66 | 34, 23, 28, 22, 4, 39<br>25 | 54, 41, 43, 60, 57, 46<br>50·16 | 54, 42, 59, 45, 38, 45<br>47·16 | 32, 6, 32, 40, 3, 11<br>20·66 |
| Grand mean of egg numbers . . | 33·52 | | | | | |
| **Small buds (less than 15 mm. long)** | | | | | | |
| Species or hybrid . | *racemosum* | *leucaspis* | *artosquameum* | *Albrechtii* | *atlanticum* | 'Blue Tit' |
| Bud size (mm.) . | 9 × 5 | 12 × 10 | 10 × 5 | 9 × 6 | 10 × 4 | 10 × 4 |
| Egg numbers and mean . . | 1, 0, 1, 2, 0, 0<br>0·66 | 15, 7, 16, 13, 12, 16<br>13·16 | 0, 0, 0, 0, 0, 0<br>0 | 0, 0, 0, 0, 0, 0<br>0 | 0, 0, 1, 0, 0, 0<br>0·16 | 0, 1, 2, 3, 0, 1<br>1·16 |
| Grand mean of egg numbers . . | 2·52 | | | | | |

the sleeves of the first varieties mentioned—probably owing to contact with moisture from the soil. No nymphs were found on the bush. On May 29 a further examination revealed three or four nymphs on seedlings under the bush. This would, however, be a very small percentage of the total.

*R.* 'Loderi White Diamond.' MR. F. W. DOBBS of Westbourn, Wentworth Estate, Virginia Water, Surrey, kindly permitted some field work to be done in his garden, and here on April 21 eggs were noticed on buds of this hybrid. One bud with eggs was enclosed in a muslin sleeve. On May 16 an examination revealed no hatching and no nymphs on the bush—the same on June 8. Some scales collected from below the bush were examined on this date, and some fully formed but desiccated eggs were found.

This investigation shows that these early flowering varieties were quite suitable for oviposition, and breeding, once hatching and successful dispersal have taken place. But their early date of flowering precludes any possibility of anything but a very small percentage of hatching. Those that did avoid desiccation and hatched under the *R.* 'Dairy Maid' were lucky in that they were close to some seedlings. It is doubtful whether they would have succeeded in establishing themselves otherwise, at so early a stage.

It would therefore appear that a collection of early flowering varieties if not surrounded by a reservoir of wild Ponticums would not permit of the build-up of large populations of the leaf-hopper.

Investigations should also be made on the time of flower bud formation, for late varieties such as *R. auriculatum* and *R.* 'Polar Bear' may miss the main wave of oviposition by the Jassid in August and early September.

There was some indication that tightly adpressed bud scales typical of many of the hybrids *R.* 'Doncaster' and *R.* 'Earl of Athlone' attracted oviposition with a mean of 27·91 eggs per bud against 3·66 for the more leafy budded *R. auriculatum*. With very loose scales, as in *R. Griersonianum* where no eggs have ever been found, a possible explanation is that the female cannot obtain sufficient leverage for successful oviposition. This is purely a suggestion for which there is no direct evidence.

A table has been prepared to show the range of egg numbers found on different species and hybrids in January 1950 at Tower Court, Ascot. The incidence of bud blast observed at this time is indicated by the following arbitrary system.

— nil ++ medium
+ light +++ heavy

## TABLE II

### RECORD OF EGG COUNTS AT TOWER COURT, JANUARY 1950

| Species or Hybrid | Size of bud | Number of eggs on each bud | Degree of blasting observed |
|---|---|---|---|
| *R. auriculatum* | large | 0, 0, 0, 0, 0, 0 | — |
| *R. Griersonianum* | large | 0, 0, 0, 0, 0, 0 | — |
| *R.* 'Polar Bear' | large | 0, 0, 0, 0, 0, 0 | — |
| *R.* 'Argosy' | large | 0, 0, 0, 0, 1, 0, 0 | — |

## TABLE II—*continued.*

### RECORD OF EGG COUNTS AT TOWER COURT, JANUARY 1950

| Species or Hybrid | Size of bud | Number of eggs on each bud | Degree of blasting observed |
|---|---|---|---|
| *R. Falconeri* | large | 0, 0, 0, 0, 0, 0 | — |
| *R. fictolacteum* | large | 0, 0, 0, 0, 0, 0 | — |
| *R. croceum* | medium | 0, 0, 0, 0, 0, 0 | all frosted |
| *R. Wardii* | medium | 0, 0, 0, 0, 0, 0 | all frosted |
| *R. diaprepes* | large | 0, 0, 0, 0, 0, 0 | — |
| *R. artosquameum* | small | 0, 0, 0, 0, 0, 0 | — |
| *R. (Azalea) Albrechtii* | small | 0, 0, 0, 0, 0, 0, 0, 0 | + + |
| *R. (Azalea) atlanticum* | small | 2, 0, 0, 0, 1, 2, 0, 0, 0 | — |
| *R.* 'Queen Souriya' | medium | 0, 0, 3, 1, 0, 0, 0 | — |
| *R. racemosum* | small | 1, 0, 0, 0, 0, 1, 2, 2 | — (frost) |
| *R.* 'Blue Tit' | small | 1, 1, 5, 1, 0, 1, 0, 3, 1, 2 | + ? (frost) |
| *R. oreodoxa* | medium | 8, 1, 21, 13, 12, 14, 2 | — |
| *R. repens* | small | 0, 0, 13, 5, 5, 4, 2, 3 | + ? (frost) |
| *R. selense* | small | 1, 21, 1, 3, 8, 16 | — |
| *R. leucaspis* | small | 15, 15, 7, 16, 13, 12, 8, 16 | — |
| *R. telopeum* | small | 0, 0, 4, 13, 1, 3 | — |
| *R.* 'Earl of Athlone' | medium | 44, 42, 41, 24, 39, 31, 27 | + + |
| *R.* 'Helen Schiffner' | medium | 5, 0, 2, 0, 1, 2, 10 | + (dark bud) |
| *R. (Azalea) japonicum* | small | 12, 16, 17, 12, 11, 13, 15, 9 | + + |
| *R. phaedropum* | small | 44, 4, 24, 27, 23, 11, 48 | + + (all grade 1) |
| *R.* 'Lady Primrose' | medium | 34, 41, 43, 60, 57, 46 | + + (all grade 1) |
| *R. Beanianum* | medium | 32, 37, 6, 40, 3, 16, 30, 11 | + + + |
| *R.* 'Doncaster' | medium | 34, 18, 23, 28, 22, 39, 4 | + + + (all grade 2) |
| *R.* 'Cynthia' | medium | 32, 53, 39, 54, 56, 30 | + + + (all grade 2) |
| *R.* 'Bagshot Ruby' | medium | 52, 52, 47, 44, 45, 52, 45 | + + + (all grade 2) |
| *R.* 'G. A. Sims' | medium | 54, 42, 47, 59, 45, 38, 34 | + + + (all grade 3) |
| *R. ponticum* | medium | Average per bud, 28 | + + |

*N.B.*—"Frost" indicates winter death without fungal coremia.

The above list suggests either that bud blast may be directly associated with the leaf-hopper or that there is some factor in the bud which is favourable to disease and insect independently. We believe the first hypothesis to be more reasonable. In April and May 1951, visual observations on the incidence of bud blast have been made at Westbourn, Wentworth, Surrey (MR. DOBBS). In general the results of the earlier egg survey at Tower Court have been confirmed. The following table summarizes the information gained:

## TABLE III

### (a) FREE FROM BLAST OR EGGS

| Species or Hybrid | Remarks |
|---|---|
| *R. fulvum* | heavy dark brown indumentum |
| *R. fictolacteum* | heavy indumentum |
| *R. Thomsonii* | |
| *R. lutescens* | |
| *R. campylocarpum* | |
| *R. discolor* | long sheathing bracts |
| *R. cinnabarinum* | |
| *R. barbatum* | very sticky bud |
| *R. yunnanense* | small globular bud |
| *R. Augustinii* | |

(b) EGGS PRESENT WITH LITTLE OR NO BLAST

| Species or Hybrid | Remarks |
|---|---|
| *R. neriiflorum* | |
| *R.* 'Cynthia' | some healthy growth buds with eggs |
| *R.* 'Gibraltar' | |
| *R.* 'Loderi White Diamond' | eggs shed on early flowering |
| *R.* 'Dr. Stocker' | about 20 per cent. blast |

(c) HIGHLY INFECTED WITH BLAST. EGGS PRESENT

| | |
|---|---|
| *R.* 'Fastuosum flore-pleno' | estimated 75 per cent. blasted |
| *R.* 'Britannia' | 90 per cent. blasted |
| *R. cheiranthifolium* | nearly 100 per cent. blasted |
| *R.* 'Bodartianum' | only 20 flowers on large tree |
| *R.* 'Pink Pearl' | nearly 100 per cent. blasted |
| *R.* 'Hugo de Vries' | nearly 100 per cent blasted |

(d) 'BUD BLAST' PRESENT WITHOUT EGGS

| | |
|---|---|
| *R. croceum* | damaged by cold |
| *R. Wardii* | damaged by cold |
| *R. Souliei* | frosting frequent |
| *R. repens* | eggs sometimes present |

*Control of Bud Blast*

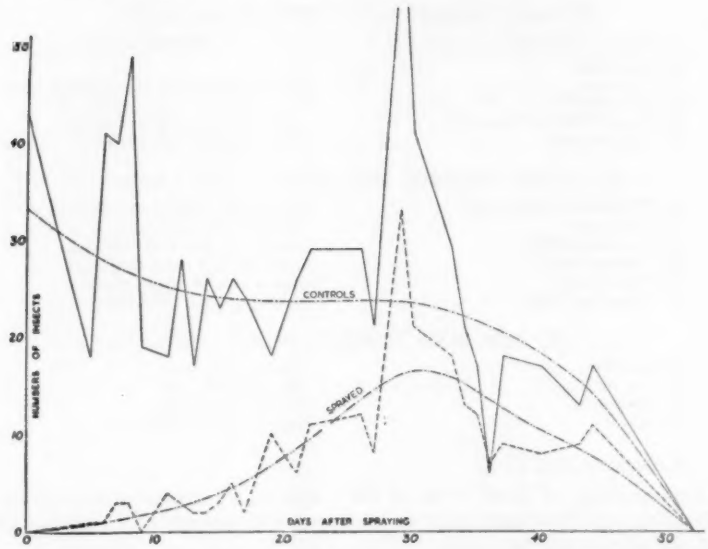
Hand picking of dead buds as they appear, combined with regular spraying with Bordeaux mixture has been recommended for the control of the disease (DAVIS, 1940).

(a) *Control of the Fungus.* During 1950 single plants of *R.* 'Marchioness of Lansdowne,' *R.* 'Doncaster,' *R.* 'Bagshot Ruby' and *R.* 'C. B. Van Nes' in the garden of MR. DOBBS at Wentworth were sprayed fortnightly with a proprietary Bordeaux mixture from June 15 until October 15. These plants have all borne a good crop of flowers for the first time for several years. The plant of *R.* 'Bagshot Ruby' was one of a row of six, and the percentage of blasted buds was 10 per cent. against 75 per cent. for the unsprayed plants. A word of warning must be sounded regarding the use of copper fungicides, since brown spotting and leaf drop may occur in sensitive hybrids several months after spraying. The substitution of a mercury fungicide will be tried in the 1951 trials.

(b) *Control of Leaf-hopper.* In view of the invasion of susceptible plants from surrounding bushes, the only control of the insect which seems worth while must be done during the egg laying period. Present observations indicate that this period starts from 2 to 3 weeks after the first adults are seen. Spraying might therefore be done between August 1 and October 1, when the adult population falls rapidly.

Preliminary experiments at Silwood Park by P. T. WALKER indicate that *Graphocephala* is readily killed by DDT sprays applied at ordinary commercial rates (0·1 to 0·2 per cent.) and that treated foliage remains toxic to the Jassid for a period of 2–3 weeks.

Field counts of hopper populations on bushes which had been sprayed with 0·2 per cent. DDT as wettable powder, confirmed the laboratory findings. Daily observations revealed that for fourteen days after a spraying the bushes remained quite free of *Graphocephala.* After this period, however, the population speedily returned to normal by immigration (Text Fig. 1).




TEXT FIG. 1—The effect of DDT spraying on populations of leaf-hopper on Rhodendron.

The results of DDT spraying are difficult to assess at this stage of the work. There is no doubt as to the marked increase in flowering in a number of hybrids sprayed twice with DDT at Wentworth (August 5 and August 20). Favourable growth conditions contributed to this result, since unsprayed bushes also produced a few flowers.

Since there appears to be no danger of scorching the foliage with DDT provided that formulations approved under the Ministry of Agriculture Approval scheme be used, it may be recommended that isolated susceptible bushes be sprayed every fortnight from August 1 to the end of the leaf-hopper flight. In gardens where there are no surrounding banks of *R. ponticum* it is probable that one or two good sprayings would control the Jassid population sufficiently.

Since *Graphocephala* adults rest and feed mainly on the upper leaf surfaces, it is not necessary to spray inside the bushes, but if it is desired to control the Rhododendron lace bug *Stephanitis rhododendri* Horv. the under surfaces of the leaves may also be sprayed.

Trials are in progress with one of the systemic insecticides (Pestox III) against both these Homoptera.

These *ad hoc* preliminary trials are promising enough to point to a future of combined insecticide and fungicide application by means of small motor sprayers in the larger gardens, or by pneumatic sprayer or syringe, where there are a few bushes only to be treated. There is no intrinsic difficulty in applying the materials.

To summarize, we may claim on the basis of work over two seasons to have shown a significant association of bud blast with *Graphocephala*,

to have suggested a number of resistant species and hybrids either for cultivation or as parents, and to have recommended for trial on a plot scale, two lines of chemical control.

It is to be hoped that interest will be aroused in the further investigation of bud blast and that support may be forthcoming for a programme of planned research into the causation and control of the disease.

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To DR. R. BLACKITH of the Imperial College Field Station, thanks are due for his ready assistance with statistical analyses. The photograph we owe to MR. J. SIDDORN.

We also thank MR. D. E. GREEN, Mycologist to The Royal Horticultural Society, for placing his experience of the disease freely at our disposal, and finally to PROFESSOR J. W. MUNRO, C.B.E., Director of Imperial College Field Station, Silwood Park, for his encouragement and help throughout the investigation.

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# THE CHROMOSOME HISTORY OF CULTIVATED NERINES*

*E. K. Janaki Ammal, D.Sc.*

### *Introduction*

"DAFFODILS in the Spring—Nerines in Autumn, these are my delights among bulbous plants," an enthusiast was heard to exclaim at the Autumn Show of the R.H.S. in 1912—and HERBERT CHAPMAN recorded it in the pages of the *Garden* of that year in which is published an illustration of the exceptionally fine specimen of *Nerine undulata* which evoked that remark. This statement is as true today as it was in 1912—except that, during the last forty years, thousands of new varieties of Daffodils have literally flooded the spring flower shows, while Nerines have continued to remain the aristocrats of the bulb world—surpassing even Orchids in the rarity of their appearance. When, however, a collection of Nerines does descend on an October morning from the garden of MR. EDMUND DE ROTHSCHILD or COL. R. S. CLARKE the effect they produce

* Contributions from the Cytological Department, R.H.S. Gardens, Wisley, No. 4.

is almost electric. Ardent admirers hover like bees around the exhibit and one hears exclamations of delight at a fascinating 'Joan,' a gallant 'Lionel' or a charming 'Alice' or the rosy-fingered 'Aurora,' while the 'Amorettas,' 'Gaby Deslys' and 'Lord Grenfells' or the galaxy of "Ladies" of an earlier day fade into insignificance before a single flower of 'Inchmery Kate.' Looking at a display like the one in 1949 when 'Inchmery Kate' made its first appearance, one cannot but be impressed by the variety of colour and tone that there is in the genus *Nerine*. In the Daffodil it is the corona or trumpet that is the most distinctive part of the flower. In Nerines it is the perianth, the colour of which may vary from bright crimson or scarlet to bright pink or salmon dusted with gold, or shell pink or the purest white. There is a touch of mauve present in some varieties and stripes of a darker or paler hue running down the middle of the petals in others. The petal may be crisped or uncrisped and the anthers long and erect or short and declinate.

Those who saw 'Inchmery Kate' in October 1949 saw something entirely new in Nerines, for this beautiful shell-pink Nerine has not only larger petals than any exhibited before, but it is the first of a new line. It is unique because it is the first tetraploid Nerine ! In the nucleus of every cell of this magnificent Nerine there are 44 chromosomes instead of the 22 found in diploid wild species, or the 33 of the triploid ancestors from which it arose. The arrival of a tetraploid in a cultivated plant generally marks a turning-point in the history of its cultivation. Not only are new segregations available for recombination by the breeder for the production of newer and better varieties, but new triploids can be made almost to order by crossing a tetraploid with a diploid. These are often sterile and are all the better for it in bulbous plants which can be propagated vegetatively (Fig. 174).

The first tetraploid Daffodil, 'King Alfred' ($x = 7$, $2n = 28$), appeared in 1899, just over over 50 years ago. It has taken nearly three centuries of cultivation to produce the first tetraploid Nerine ! This is therefore an opportune moment to look back at the past history of Nerines in this country and to take stock of what has been happening since the Guernsey Lily, *Nerine sarniensis*—that shipwrecked Robinson Crusoe from the Channel Islands—bloomed for the first time in England, according to MRS. LOUDON in the garden of GENERAL LAMBERT in Wimbledon in the year 1659 (Fig. 172).

## NERINE SPECIES IN THE WILD AND UNDER CULTIVATION

The genus *Nerine* comes from South Africa. It is indigenous to the Cape and several of the twenty-odd species inhabit very restricted areas like a valley or a ravine, and have sometimes been collected only once.

For purposes of classification the species may be subdivided into those with long peduncles which are the ones best known in horticulture as the ancestors of our cultivated Nerines, and those with short thick peduncles. To the latter group belong the interesting desert species *N. lucida* from the Karoo with its early-flowering habit and an umbel of 20 to 40 flowers. Introduced as early as 1820, it is now drawing the attention of American breeders as a possible new parent. To this group also belong *N. duparquetiana* from the Kalahari and the broad-

leaved *N. marginata*. In nature, the short peduncles break off and the wheel-like umbel rolls in the desert sand, dispersing the fleshy seeds as it travels. Both *N. lucida* and *N. marginata* are now represented in the collection at Wisley. They are diploids ($2n = 22$).

We now turn to the species with long peduncles, the ancestors of our cultivated Nerines. Two distinguishing characters that strike one in making a study of these species are the erect or declinate position of the flower and the crisped or non-crisped nature of the petals. Among the species with erect non-crisped flowers the best known is *N. sarniensis* ($2n = 22$), the Guernsey Lily, with its umbel of many bright scarlet flowers. From its original home on Table Mountain several forms of this species have been introduced, the dull crimson-flowered *N. Plantei*, the rose-red *N. rosea*, the poppy-coloured *N. venusta*, and the salmon-coloured variety *N. Corusca*, all diploids. *N. Corusca maxima*, which arose in cultivation in 1864, has $2n = 33$ and is probably the first triploid in the genus.

*N. curvifolia* is a species allied to *N. sarniensis*, differing from it in having glaucous leaves which are sickle-shaped. It was introduced from the Cape in 1788, and a form with many more flowers than the wild species arose in cultivation in England in 1882 as *N. Fothergillii*. This variety has 24 instead of 22 chromosomes, and the still more magnificent form of 1907, *N. Fothergillii major*, is a triploid ($2n = 33$).

Among the species with crisped petals and declinate flowers is the pink *N. flexuosa* ($2n = 22$) which was introduced from the Cape in 1795. This species likes a moist soil, and it flowers only after the leaves have appeared. In its native home it grows up to 4,000 or 5,000 feet, and according to O'BRIEN who experimented on it, the bulbs can stand freezing. A white form of the species, var. *Sandersoni*, was collected from the Transvaal and a very pale variety which flowers earlier, var. *pulchella*, from the Kalahari region. By some botanists it is given the rank of a species. It was the *pulchella* form of *N. flexuosa* that was used by early hybridizers of Nerines such as DEAN HERBERT and O'BRIEN. A form called *N. flexuosa major* appeared as early as 1897. This plant is a triploid ($2n = 33$).

A plant combining the erect flowers of the Guernsey Lily, *N. sarniensis*, and the crisped petals of *N. flexuosa* is *N. Moorei*. It is a natural triploid species ($2n = 33$) which was collected from the Cape in 1886.

Closely resembling *N. flexuosa* but with smaller flowers and leaves are the two species *N. humilis* and *N. undulata*, both introduced from the Cape in 1767. Unlike *N. flexuosa*, the inflorescence in both these species is centrifugal, *i.e.* the older flowers are found at the centre of the umbel. Triploid varieties with larger flowers exist in both these species—the *N. undulata* of 1912 is probably one such. It is also known as *N. aucta*. In morphological characters it is intermediate between *N. undulata* and *N. humilis*.

A broad-leaved Nerine, which combines the declinate corolla of *N. flexuosa* with the uncrisped perianth of *N. sarnensis* and which flowered at Kew in 1868, was named *N. pudica* by J. D. HOOKER who writes of it thus in *Bot. Mag.* t. 5901."I fail to find either a description answering to this plant or a Herb. sp. in Kew. I am unaware of its precise locality

or its introduction. Its nearest ally is *N. flexuosa.*" I examined a plant with this name in the Kew collection and found it to be a diploid ($2n = 22$). INAREYAMA (1937) reports it as a triploid ($2n = 33$). He probably examined the variety known as *Elwesii* with larger and broader leaves which arose in cultivation in 1900.

The thin-leaved *N. angustifolia* which looks very like *N. filifolia* is a fairly high altitude Nerine. It was collected from the summit of Bosch Berg in 1896, and is found also in the Orange Free State and Natal.

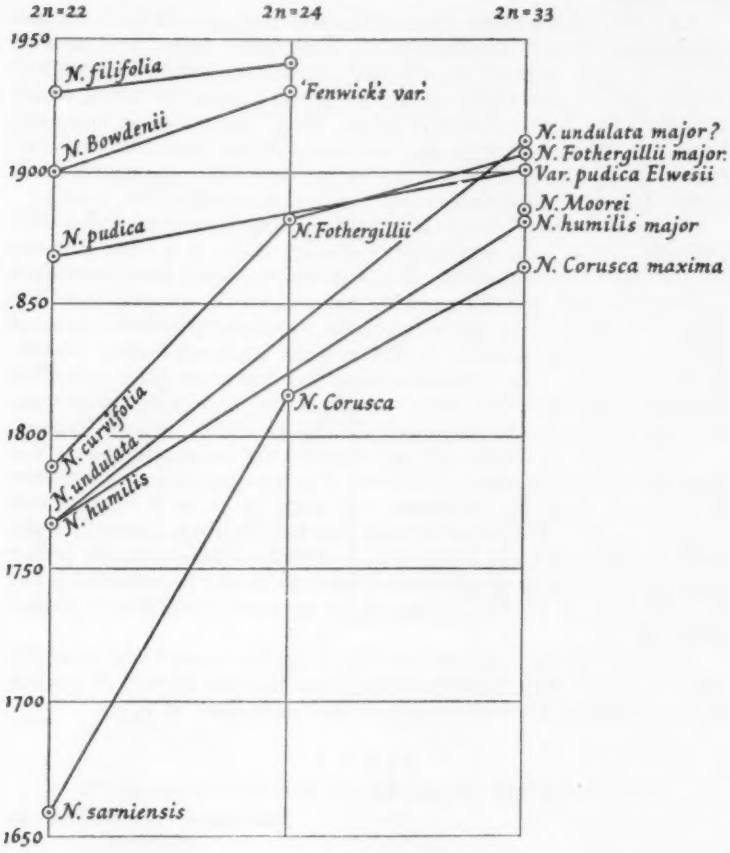
These thin-leaved species, which also have very small flowers, have not contributed very much to the evolution of garden Nerines. Amongst the collection at Wisley are *N. filifolia* and *N. masanorum*, both diploids. *N. filifolia* occasionally has thrown out forms with $2n = 24$ chromosomes. When W. M. JAMES of California crossed it with *N. Corusca major* it gave the interesting hybrid 'Chameleon.'

We now come to the species which has made history in Nerine cultivation—*N. Bowdenii*, named after MR. ATHELSTAN CORNISH BOWDEN, Surveyor-General of the Cape, who sent bulbs of this magnificent Nerine species to his mother in the year 1900. It is undoubtedly related to *N. flexuosa* and like it has no dormant stage and loves a damp soil. It received an Award of Merit in 1904 and a white form of it the same honour in 1911. In 1927 the white form was still considered the best white Nerine in cultivation. What has become of this white form now? Is it masquerading under a different name? I leave it to the experts to decide. There are several forms of *N. Bowdenii* in cultivation. I have examined *N. Bowdenii* var. *pallida* and *N. Bowdenii* 'Fenwick variety' growing at Wisley. The pale form, var. *pallida*, and a form called *gigantea*, have $2n=22$, the normal chromosome complement of the genus, while the more beautiful 'Fenwick variety' has two extra chromosomes ($2n = 24$). A still darker form from Highdown has 24 chromosomes and a fragment. This duplication of two or more chromosomes of the normal complement of 22 is a constant occurrence in Nerines, and many of the more robust forms of the species found both wild and in cultivation have extra chromosomes. In cultivation it is the precursor to the formation of triploids—as is so well illustrated by *N. curvifolia* ($2n = 22$), which gave rise to *N. curvifolia* var. *Fothergillii* ($2n = 24$) and later to *N. Fothergillii major*, $2n = 33$ (see Chart). It is very likely that triploidy is induced by irregularity in meiosis occurring as a result of the presence of extra chromosomes.

## HYBRID NERINES

Species of Nerine cross very freely, and the earliest hybrids were all interspecific and diploids. Many of these have been lost in cultivation. *N. Manselli* (*N. flexuosa* × *N. curvifolia*) is one of the outstanding ones that has survived; it is a diploid and late flowering. In the latter half of the nineteenth century there was a great impetus for hybridizing Nerines. By this time many of the species in cultivation had already produced triploid mutants which, because of their larger flowers, were selected as more suitable parents. Thus we may say that the appearance of the first triploid, *N. sarniensis Corusca maxima*, in 1864 marks the beginning of good Nerine hybrids in this country.

*CHRONOLOGY OF TRIPLOIDY IN NERINE SPECIES*




The first hybrids of note were those between triploids and diploids. They had a few extra chromosomes than the diploid. 'Excellence' ($2n = 28$), one of DEAN HERBERT's hybrids, is one such. It is a cross between *N. flexuosa* ($2n = 22$) and *N. humilis major* ($2n = 33$). *N. elegans carminata* ($2n = 28$) of O'BRIEN is another. Amongst the oldest triploid hybrids are 'Lady Llewellyn' and 'Lady Stirling Maxwell' of ELWES (1897). CHAPMAN'S 'Rotherside,' another triploid which received an Award of Merit in 1916, is a cross between *N. corusca* ($2n = 24$) and *N. Fothergillii* ($2n = 24$).

The next important event in Nerine culture was the introduction of *N. Bowdenii* in 1900. It marks a new era in Nerine breeding in this country. The species brought two very important new characters—the large flower and winter hardiness.

MESSRS. VEITCH were the first to exploit *N. Bowdenii* as a parent.

Crossed with *N. Fothergillii* it gave rise to 'Exonia,' a beautiful cerise-pink hybrid.

'Aurora'—that mother of many beautiful pink show flowers—is also a hybrid between *N. Bowdenii* and *N. Fothergillii*. Raised by J. ROSE of Oxford in 1908, it received an Award of Merit in 1920. It is a triploid hybrid ($2n = 33$) and quite unlike the hybrid 'Exonia' of VEITCH, which is diploid ($2n = 22$). Its sister plant, 'Hera,' also a triploid, is equally beautiful. "Outstanding in size, one would almost think the cross contained *Amaryllis Belladonna* blood in it," says MR. F. HANGER writing about 'Aurora' in his article on Nerines in this same JOURNAL (1946).

Many of the best hybrids of today have come from these and similar triploids. 'Alice,' the mother of 'Inchmery Kate,' is a cross between 'Aurora' and *N. flexuosa alba*. It has 36 chromosomes, three more than a normal triploid, and this probably accounts for the tetraploid seedling it produced (Fig. 173). According to MR. HANGER who made this cross at Exbury, the pollen parent of 'Inchmery Kate' was 'Lady Foster,' a small-flowered Nerine. I am inclined to think that 'Inchmery Kate' is a selfed seedling of the beautiful 'Alice.' In either way, a $2x$ pollen grain must have fertilized a $2x$ egg-cell to produce this $4x$ marvel amongst Nerines.

No account of Nerine will be complete without a reference to the interesting hybrid *Nerine* × *Fletcheri*. This intergeneric hybrid between Nerine and *Amaryllis Belladonna* was made by W. H. B. FLETCHER of Bognor in 1926. It flowered for the first time in 1942, I examined the plant at Highdown and found it to be a diploid ($2n = 22$). Its pollen sterility is as high as 96 per cent. This cross is easy to make and it has been repeated at Wisley. It thus opens up new possibilities in Nerine breeding.

In Table II, I have given a cyto-chronological account of some of the notable garden hybrids and seedling from the first triploid *N. corusca major* of 1864 to the first tetraploid 'Inchmery Kate' of 1949.

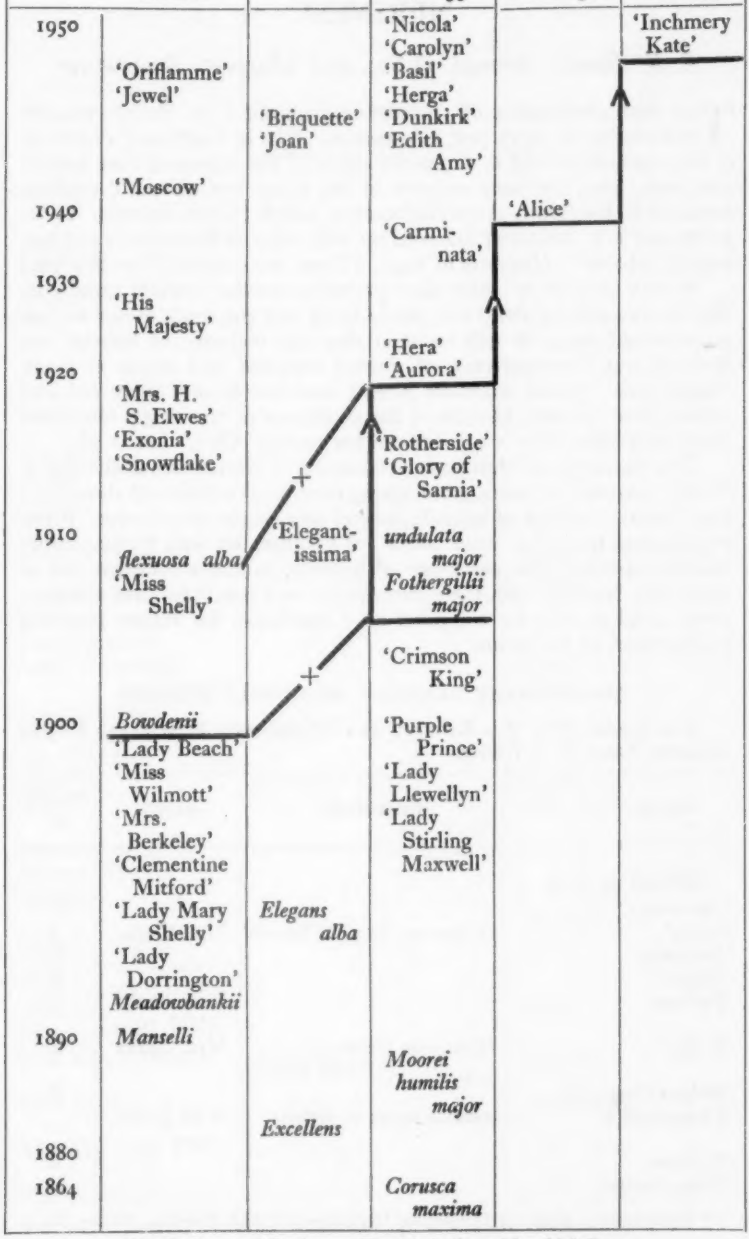
TABLE I

CHROMOSOME NUMBERS OF SPECIES OF NERINES

| | | *Distribution of Diploids in S. Africa.* |
|---|---|---|
| *N. angustifolia* | $2n=22$ | Kalahari, E. Natal, Orange Free State. |
| *N. appendiculata* | $2n=22$ | E. Natal. |
| *N. lucida* | $2n=22$ | Kalahari, Orange Free State, Transvaal, Bechuanaland. |
| *N. marginata* | $2n=22$ | Central Region Tulbagh. |
| *N. masanorum* | $2n=22$ | Kalahari. |
| *N. Bowdenii* | $2n=22, 24$ | Cape Peninsula. |
| *N. filifolia* | $2n=22, 24$ | Kalahari, Orange Free State. |
| *N. curvifolia* | $2n=22, 24, 33$ | Cape Peninsula. |
| *N. sarmiensis* | $2n=22, 24, 33$ | Cape Peninsula. |
| *N. flexuosa* | $2n=22, 33$ | Transvaal. |
| *N. humilis* | $2n=22, 33$ | Table Mountain. |
| *N. pudica* | $2n=22, 33$ | Kew! cult. |
| *N. undulata* | $2n=22, 33$ | Kalahari, Orange Free State. |
| *N. Moorei* | $2n=33$ | Cape. |

TABLE II

THE CYTO-CHRONOLOGY OF CULTIVATED NERINES




The Pedigree of 'Inchmery Kate' is indicated by thick lines.

# CHROMOSOME NUMBERS IN HYBRID NERINES*

*E. K. Janaki Ammal, D.Sc., and Margery Bridgwater*

THE first publication of chromosome numbers in Nerine was by INARIYAMA in 1937 (see *Chromosome Atlas of Cultivated Plants* by C. D. DARLINGTON and E. K. JANAKI AMMAL). He examined four species and found that the basic number of the genus was eleven, a number common in the family Amaryllidaceae to which Nerine belongs. W. M. JAMES and F. T. ADDICOTT followed up with a list of five species and five named hybrids in *Herbertia* of 1941. (These are marked (†) in this list.)

Nerine hybrids in cultivation probably number several hundreds. We have examined about 100 plants in all and the result of our studies is presented here. It will be seen that the majority of hybrids are diploids, but the occurrence of sixteen triploids and nearly as many "aneuploids" should stimulate Nerine breeders to seek them out and utilize them to make hybrids of the excellence of the single tetraploid 'Inchmery Kate,' ($2n = 44$) or even her parent 'Alice.' ($2n = 36$.)

The technique of chromosome counting of Nerine was developed at Wisley—counts are made from young ovules. We invite all those who have named varieties of hybrids to send us a single open flower. From experts and from the "stud books" of breeders we seek further information regarding the parentage of hybrids, so that a complete list of cultivated Nerines with their description and parentage and chromosome number may be compiled as a handbook for future breeding programmes in the genus.

## CHROMOSOME NUMBERS OF HYBRID NERINES

B = Borde Hill; E = Exbury; H = Highdown; K = Royal Botanic Gardens, Kew; W = Wisley.

| NAME | PARENTAGE | RAISER | GROWN AT |
|---|---|---|---|
| *Diploids* $2n = 22$ | | | |
| 'Abundance' | | | W |
| 'Adela' | 'Countess Grey' × 'Aurora' | Mrs. Clarke | B |
| 'Amoretta' | | | W |
| 'Athene' | | | E |
| 'Barbara' | | L. de Rothschild, 1939 | E |
| 'Bunty' | 'Countess Altamont' × 'Mrs. Clarke' | Mrs. Clarke | B |
| 'Helena Chapman' | | | H |
| 'Chameleon'† | *corusca major* × *filifolia* | W.M.James, 1924 | |
| 'Coralina' | | | B |
| 'Gaby Deslys' | | | H |

* Contributions from the Cytological Department, R.H.S. Gardens, Wisley, No. 5.

| NAME | PARENTAGE | RAISER | GROWN AT |
|---|---|---|---|
| *Diploids* $2n = 22$ | | | |
| 'Elegans alba' | *flexuosa* × *sarniensis* | T. S. Ware, **F.C.C.** 1893 | |
| 'Exonia' | *Bowdeni* × *Fothergillii* | Veitch, **A.M.** 1919 | K |
| 'Francis' | | L. de Rothschild, 1941 | E |
| 'Gloaming' | | | H |
| 'Grilse' | | | H |
| 'Hadrian' | | L. de Rothschild, 1941 | E |
| 'His Majesty' | | Barr, **A.M.** 1922 | K |
| 'Hon. Mrs. Wynne' | | | B |
| 'Hurricane' | | L. de Rothschild, 1937 | E |
| 'Inominata' | | | H |
| 'Jewel' | | | H |
| 'Kitty' | ('Lady Rankin' × 'Mrs. Shelly') × 'Mrs. Praed' | | B |
| 'Lady L. H. Beach' | | Elwes, **A.M.** 1897 | B |
| 'Lady De Walden' | | | B |
| 'Lady Downe' | | | B |
| 'Lady Houlkes' | | | B |
| 'Lady Clementine Mitford' | | Elwes, **A.M.** 1898 | B |
| 'Lady Montague' | | | B |
| 'Lady Stanley' | | | B |
| 'Lord Grenfell' | | | H |
| 'Manselli' | *flexuosa* × *curvifolia* | **F.C.C.** 1887 | |
| 'Mary' | 'Countess Altamont' × 'Mrs. Praed' | Mrs. Clarke | B |
| 'Meadowbankii' | *sarniensis* × *Fothergillii* | | B |
| 'Montreuil' | | | H |
| 'Moscow' | | L. de Rothschild, 1941 | E |
| 'Miss Carrington' | | | B |
| 'Miss Frances Clarke' | | | B |
| 'Miss Rosamund Elwes' | | | B |
| 'Miss Moore' | | Elwes | |
| 'Miss Norton' | | | B |
| 'Miss Sheepshanks' | 'Countess Altamont' × 'Mrs. Clarke' | Mrs. Clarke | B |
| 'Miss Shelley' | | Elwes, **A.M.** 1904 | B |
| 'Miss Willmott' | | Elwes, **A.M.** 1899 | B |
| 'Mrs. Berkeley' | | Elwes, **A.M.** 1899 | B |

| NAME | | PARENTAGE | RAISER | GROWN AT |
|---|---|---|---|---|
| *Diploids* $2n = 22$ | | | | |
| 'Mrs. Dent Brokenhurst' | | | | B |
| 'Mrs. Clarke' | | | | B |
| 'Mrs. Cooper' | | | | B |
| 'Mrs. H. J. Elwes' | | | Barr, **A.M.** 1918 | E |
| 'Mrs. A. Eoden' | | | | B |
| 'Mrs. Kingscote' | | | | B |
| 'Mrs. Miller Mundy' | | 'Countess Altamont' × 'Mrs. Clarke' | Mrs. Clarke | B |
| 'Novelty' | | Nerine × Agapanthus ? | T. S. Ware, **A.M.** 1896 | |
| 'Near Queen Mary' | | | | B |
| 'Diana Oliver' | | | | B |
| 'Oriflamme' | | *Fothergillii major* × 'Aerolite' | L. de Rothschild, 1947 | E |
| 'Othello' | | | | W |
| 'Peggy' | | 'Miss Shelly' × 'Mrs. Praed' | | B |
| 'Peru' | | | | E |
| 'Snowflake' | | | Elwes, **A.M.** 1911 | B |
| 'Stephanie' | | | | B |
| 'Vivien' | | ('Lady Rankin' × 'Mrs. Shelley') × 'Mrs. Praed' | | B |
| 'R. B. Whitehead' | | | | B |
| *Diploid* + | | | | |
| 'Briquette' | $2n = 23$ | | | |
| 'King of the Belgians' | $2n = 23$ | | Chapman | H E |
| 'Curiosity' | $2n = 24$ | | Elwes | B |
| 'Lionel de Rothschild' | $2n = 24$ | | L. de Rothschild, 1941 | E |
| 'Basil' | $2n = 24$ | 'Francis' × 'Edith Amy' $3x$ | Hanger, 1947 | W |
| 'Bagdad' | $2n = 25$ | *Fothergillii* × 'Purple Prince' $3x$ | L. de Rothschild, 1933 | E |
| *Elegans carminata* | $2n = 26$ | *flexuosa* × *sarniensis* | O'Brien | K |
| 'Joan' | $2n = 26$ | | L. de Rothschild, 1942 | E |
| 'Mrs. Aimes' | $2n = 26$ | | | B |
| 'Mrs. George Barr'† | $2n = 28$ | | | |
| *Elegantissima* | $2n = 28$ | *Manselli* × | F. Lilley, **A.M.** 1910 | |
| *Excellens* | $2n = 28$ | *flexuosa* $2x$ × *humilis major* $3x$ | Dean Herbert, 1882 | K |

| NAME | PARENTAGE | RAISER | GROWN AT |
|---|---|---|---|
| *Triploids* $2n = 33$ | | | |
| 'Aurora' | *N. curvifolia* × *N. Bowdenii* | Rose, **A.M.** 1920 | W |
| *Carminata* | | L. de Rothschild, 1933 | E |
| 'Carolyn' | | Hanger, 1948 | W |
| 'Colossum' | Old Hybrid | — | K |
| 'Dunkirk' | 'Lady Loder' × *Fothergillii major* | L. de Rothschild, 1940 | E |
| 'Edith Amy' | 'Aurora' × | L. de Rothschild, **A.M.** 1942 | E |
| 'Hera' | *N. curvifolia* × *N. Bowdenii* | Rose, 1912 | |
| 'Herga' | 'Purple Prince' × *Fothergillii major* | L. de Rothschild, **A.M.** 1942 | E |
| 'Ingens'† | | 1924 | |
| 'Kappa' | | | H |
| 'Lady Llewellyn' | | Elwes, **A.M.** 1897 | B |
| 'Lady Stirling Maxwell' | | 1897 | B |
| 'Nicola' | | Hanger, 1948 | W |
| 'Purple Prince' | | Elliott, **A.M.** 1925 | B |
| 'Queen Mary' | | | E |
| 'Rotherside' | *corusca* × *Fothergillii* | Chapman, **A.M.** 1916 | E |
| *Triploid* + | | | |
| 'Alice' $2n = 36$ | *flexuosa alba* × 'Aurora' | L. de Rothschild, **F.C.C.** 1945 | E |
| *Tetraploid* $2n = 44$ | | | |
| 'Inchmery Kate' | 'Alice' × 'Lady Foster'(?) | L. de Rothschild, **A.M.** 1947 | E |

# NOTES FROM FELLOWS

## *Cryptomeria japonica var. spiralis*

To many conifer-lovers this variety is well known at Wisley where there is a fine plant in the Rock Garden.

The Cryptomeria I attempt to describe is now about 60 feet in height. The girth of the trunk measured at 3 feet from the ground is 7 feet. The circumference of the whole tree at ground level is 68 feet, gradually tapering towards the top to very much the same shape and size as that of a fully-grown *Cupressus Lawsoniana* (Fig. 176).

Unfortunately, there is no exact record of the age of this tree which is growing at Fota Island, Cove, Co. Cork, and has not apparently yet reached its maturity. It was planted (in light sandy loam) by the late Lord Barrymore probably about 1870, and was 11 feet high in 1892. It may possibly have been imported from Japan by Messrs. Veitch at the same time as an *Acer palmatum dissectum* var. *septemlobum*, also growing at Fota Island, and known to have been obtained from this source about 1870.

This *Cryptomeria japonica spiralis* appears to be perfectly hardy, but it is planted in a sheltered position where it is never exposed to easterly winds and gales from the south-west laden with the burning salt that would turn even the hardy yew tree to a autumnal bronze.

Several attempts have been made to propagate this tree, but so far only one cutting has been successfully rooted. This was planted out in 1943 when about six inches high, and has valiantly withstood the frosts and a certain amount of snow for eight winters. But alas! it is still only about 18 inches high, and although definitely spiral in growth does not yet in any way display the beautiful whorls of golden-green branches so much admired on the parent tree as they still soar heavenwards, almost reaching the top of the old beech tree that has sheltered them for about 80 years.

HON. MRS. D. BELL.

## *Erica australis*

In MR. H. H. THOMAS' contribution in the June JOURNAL on "Show Pieces for Discerning Gardeners," he states that *Erica australis* proved tender even in a sheltered spot.

It would be a pity if this were to discourage gardeners from planting this beautiful shrub, which in late April and May is a most lovely sight in rock, heath or shrub garden. My own experience of this heath may be helpful.

I have grown *E. australis* quite successfully for many years and so far have lost none through frost, although I must have twenty or thirty of them. The original plant, now 12 years old, is exposed to cold north-east winds, and we have more than our share of heavy hoar frosts in Essex. *E. australis* starts budding in November and the flowers develop slowly all through the winter. Sometimes severe frost does damage the tips of the sprays of buds, but if so, these can be nipped out and the sprays flower just as well. Last winter we had four successive nights of thick hoar frost without the bushes suffering any appreciable damage.

MR. THOMAS mentions that his *E. australis* was so badly damaged in 1947 that it did not recover. My own experience in that most exceptional winter was rather curious.

Because *E. australis* produces its flower buds all through the winter the sap is flowing. So intensive and prolonged was the frost of that year, that the sap froze in the stems down to earth level and split them open. Fine slivers of sap ran down the stems for as much as a foot and froze. The result was that the whole plant apparently died and I cut it back to earth level.

In the spring of that year, new growth appeared and the same shrub is now over 4 feet high with more than a dozen main stems and has flowered in profusion each year since (Fig. 177).

In view of the fact that in the same year the intensive cold killed a Ceanothus nearby, I feel that it is an injustice to call *E. australis* tender. It is so beautiful and prolific in flower that I believe it fully worthy of a place in MR. THOMAS's Show Pieces. Unlike most heaths, it does not layer well, but it can be propagated fairly easily from cuttings in the usual manner, although they sometimes take rather a long time to strike.

L. W. SMITH

Hornchurch,
Essex.

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# PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1951

**Cornus florida A.M.** May 22, 1951. This is the 'Flowering Dogwood' of the Eastern U.S.A., which was introduced to cultivation in this country early in the eighteenth century. It is a small, deciduous tree with opposite, ovate leaves which often colour attractively in the autumn. The button-like heads of insignificant flowers, which appear at the ends of the twigs, are each surrounded by four paper-white, obcordate bracts, which when fully expanded in May, are very ornamental. Unfortunately, they are somewhat liable to injury by spring frosts as they open. Exhibited by Mr. W. J. Marchant, Keeper's Hill Nursery, Stapehill, Wimborne.

**Meconopsis Sherriffii A.M.** May 22, 1951. A very interesting species collected in Bhutan by Messrs. Ludlow and Sherriff. As exhibited, the plant has a basal rosette of spathulate, pale green leaves up to 5 inches long and completely covered with stiff, white hairs. The flower-stalk is a foot to 15 inches tall, bearing a few small leaves and a solitary terminal flower, at first cup-shaped but flattening with age. Six to nine in number, the broad-ovate petals are coloured an attractive light Roseine Purple (H.C.C. 629/1), shaded with smoky blue at the base, and surround a cluster of white stamens and a densely tomentose green pistil. Exhibited by Mrs. G. Knox Finlay, Keillour Castle, Methven, Perthshire.

**Olearia × scilloniensis A.M.** May 22, 1951. A most valuable white-flowered hybrid which originated from a chance cross between

*O. stellulata* and *O. lyrata* in Major Dorrien-Smith's garden at Tresco. It forms a dense, pyramidal bush up to 5 feet in height, becoming in late May or early June a mass of pure white Daisies each about ¾-inch across, so numerous as to conceal the small, dark green, wavy-margined, lanceolate leaves. Exhibited by the Director, R.H.S. Gardens, Wisley.

**Paeonia anomala var. intermedia, A.M.** May 22, 1951. The leaves of this herbaceous Paeony, which comes from a district east of the Urals, are about 8 inches long and are bipinnately divided into many dark green, linear lobes. The large single flowers are solitary, and each has eight or ten rich crimson, obovate petals surrounding a central cluster of golden-yellow stamens. Exhibited by Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea.

**Paraquilegia anemonoides, A.M.** May 22, 1951. A very rare and beautiful Ranunculaceous plant from S. E. Tibet, amenable to careful treatment in alpine house or limestone scree in favoured gardens. It forms a mossy tuft of finely-divided, biternate, glaucous leaves 2 or 3 inches high, above which it lifts solitary five-petalled flowers like small Anemones, Campanula Violet (H.C.C. 37/1) outside, slightly redder (34/2) internally, with a central boss of golden stamens. Exhibited by Mrs. G. Knox Finlay, Keillour Castle, Methven, Perthshire.

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## BOOK NOTES

"Campanulas, their Cultivation and Classification." By H. Clifford Crook. Pp. 256. Illus. (Country Life.) 35*s*.

The genus Campanula probably comprises about 300 species, many of them being attractive garden plants. There has been no monographic botanical survey of the genus as a whole since 1839, when Alphonse de Candolle revised it for his father's *Prodromus Systematis naturalis Regni vegetabilis*, vol. 7, pt. 2. Some 50 years later another able Swiss botanist Henri Feer took up the arduous task of monographing Campanula, publishing in 1890 three scholarly papers of lasting interest on the genus, but he died of consumption in 1892, aged but 35 years, with only these preliminary but promising studies to his credit. His death was a loss to horticulture, for a good botanical monograph, though possibly of no immediate utility to gardeners, supplies the only secure foundation for the identification of plants in gardens, the revision of their nomenclature and the compilation of horticultural handbooks, etc., about them. Had Feer lived, the task of Mr. H. Clifford Crook in preparing the present book would have been much simpler. As it is, wishing to provide gardeners with descriptions of every known or recorded species of Campanula, he has had to search all the important literature on the genus since 1830 when Alphonse de Candolle published his *Monographie des Campanulées*. The result is a helpful and informative work, that makes no pretence to being a scientific monograph of the genus, for which indeed there remains a great need, but that from the horticultural viewpoint is even more serviceable, since it gives many cultural details usually omitted from more botanical works. Mr. Crook is a keen amateur gardener and as he has cultivated successfully so many of the species of Campanula his book is likely to become the frequently used guide of practical gardeners interested in the genus. It is divided into seven chapters, prefaced by a short bibliography from which De Candolle's important 1839 publication is lacking and which gives no impression of the great range of literature surveyed. The first three chapters on the generic characters of the genus Campanula, their classification and cultivation are short but are followed by one of 180 pages describing in alphabetical order the more or less undisputed species, their varieties and garden forms. This is of very great value to the gardener—in fact, indispensable. Chapter V deals with a number of plants whose status is more controversial; these are arranged in groups—an arrangement which the gardener with an enquiring mind will find useful because it emphasizes the characters

they have in common but at the same time provides keys by which some at least of them can be distinguished. These include the groups typified by *C. tridentata*, *C. carpatica*, *C. garganica*, *C. lyrata* and *C. rotundifolia*, whose host of variants is so often a headache to the garden lover. The book is thus a welcome addition to the select group of horticultural works dealing with a single genus or a few closely related genera. It is well produced with nearly a hundred excellent illustrations, all but nine being from photographs by the author who has travelled widely in the mountains of Europe to study his plants in the wild as well as under cultivation in his garden in Kent. Gardeners owe him a debt of gratitude for making his experience available in this pleasant and interesting work.

W. E. TH. INGWERSEN and W. T. STEARN

"Summer and Autumn Flowers." By Constance Spry Pp. xii + 116. Illus. (Dent.) 21*s*.

Mrs. Spry is well known for her flower arrangements, but this book is more than that. After reading the "Introductory" and seeing the way it is written, one feels that the following pages are going to be of much interest and enjoyment. One is not disappointed.

There are pages dealing with many and varied flowers, and of shrubs suitable for bringing into the house and arranging in such manner as your fancy suggests and your taste, or Mrs. Spry's taste, impels. There is a particularly good chapter on old Roses which it is hoped many people will read and digest. It is good to find that the author gives us the correct name of the plant mentioned, the synonym, and when it has one, the English name. Moreover, she tells you in many cases where you can procure any plants you may want to get and grow, when to plant them, and how to treat them. Even those who already know about this work will be glad to be reminded in such a knowledgeable way.

There are twenty-four coloured and twelve monochrome plates, the former as passable as can be expected from coloured photographs. The prevalent tendency to rather overcrowd some arrangements and set flowers up in a "fan shape" is not always very pleasing, and perhaps a little study of the Japanese restraint might be advantageous. The Snowberries and Clematis seeds opposite page 96 are entirely satisfactory, but the white Delphiniums, such straight and stately columns when growing in the garden, would surely not feel happy set at all angles in the way shown. One very attractive arrangement is that on Plate XV showing brilliant Zonal Pelargoniums on a red lacquer table. It is startling—even a bit shocking—but how joyous! It gives that cheerful feeling that comes when you hear a clash of all the bells together after a wedding peal—jubilant festivity!

However, everybody should arrange their flowers in the way they like best, and this interesting and well written-book will help and stimulate them.

The Appendix is full of practical instructions born of experience, and there is a good Index.

FRANK GALSWORTHY

"Capability Brown." By Dorothy Stroud. Pp. 224. Illus. (Country Life.) 42*s*.

For eighteenth-century England the term "gardening" meant precisely "landscape gardening," and, with the exception of the mid-Victorian bedding-out aberration, that is what it has continued to mean down to the present day. If in these narrow times we can attempt no more than a rock-garden in a window-box, we still try to reproduce there a miniature landscape. This is the essential genius of the English garden—a revolt against the Italianate formalism of the Renaissance and the Dutch formalism of William of Orange.

Of all the eighteenth-century gardeners who helped to establish this typically English tradition, Lancelot Brown, though he was not the first, is certainly the best known. A man of humble origin, but of intelligence, enthusiasm, and restless energy, he travelled from great estate to great estate, assuring the owner of each that his place had "good capabilities."

Beginning at Stowe in 1740, where he followed such earlier landscapists as Bridgeman and Kent, Brown pursued his triumphant way, gardening on a vast scale—planting "clumps" of trees, cutting down ancient avenues, throwing level ground into hillocks, reducing hilly ground to gain a prospect, above all, giving to artificial lakes the appearance of natural rivers. For nearly half a century he worked unremittingly—at Longleat, Harewood, Cardiff, Euston. But, indeed, as Miss Stroud says, the list of his employers reads like Debrett. So successful was he that, when in 1770 the Duke of Leinster offered him a thousand pounds if he would so much as land in Ireland, he refused, saying that "he had not yet finished England."

Miss Stroud has produced a readable and learned book; and if a great Englishman has waited long for a worthy biography, he has not waited in vain.

GEOFFREY TAYLOR

"Alpine House Culture for Amateurs." By Gwendolyn Anley. Revised and enlarged edition, 1951. 167 pp. Illus. (Country Life, Ltd.). 15*s*.

Sub-titles have not the vogue they had in Victorian times, otherwise this book might also have been called "The Cultivation of Rock Plants in Pots." Indeed such a title might have given this publication a wider appeal, for there are many growers of these plants who can afford a frame or so but not an Alpine House. Moreover the author herself says "the large majority of plants can be better grown and flowered in frames" and in the next paragraph, "It is my considered opinion that the permanent home of the plants should be the frames and shelters." What wise words! In other words the Alpine House should correspond to the conservatory of the past. It is obvious on every page, nay, in every paragraph, that Mrs. Anley writes only from personal experience and this makes her advice so sound and the book so valuable that it should be in the library of all interested in the cultivation of rock plants in pots. This does not mean that one agrees with all the author says, *e.g.* under Shading, a colour wash on the outside of the glass does reduce the temperature inside the house whereas the internal muslin, as stated, does not. The list of plants is most comprehensive but the asterisk indicating doubtful hardiness might have been used more freely to warn the beginner of the risks he is taking if he spends money on such subjects as *Zephyranthes grandiflora*, *Anopterus glandulosus* and the Stylidiums to mention only a few which really cannot be called hardy. A fault in the Tables which merits attention in any future editions is the splitting with letter-press, *e.g.* under Orchids (Hardy Terrestial), Pleione and Serapias are split off from the others by this remark, "there are many other species of orchid, but the general tendency is for them to become attenuated under pan culture." Surely this is only meant to apply to Serapias as the Pleiones are about the easiest hardy Orchids to grow in pans. There are several similar occurrences which the reader will discover for himself. There are several typographical errors and some of the plates lack definition. These however are small blemishes and I repeat that the book is a very valuable one and has been a great pleasure to read.

E. B. ANDERSON

" Rose Selection and Cultivation." By F. S. Harvey Cant. Pp. vii + 139. Illus. (MacGibbon & Kee.) 10*s*. 6*d*.

By the death of Sydney Harvey Cant, the Rose world suffered a loss which only those who knew him personally can appreciate. He was a great Rose grower and a great gentleman, wise in the Councils of the National Rose Society and ever ready to give to others of his vast knowledge of the flower he loved.

"Fifty Years with Roses" took him back to the days of the Tea Roses, before the time when *Rosa foetida* revolutionized the modern Rose, and he writes with a lively personality and humour of his experiences from his school-leaving days as apprentice ploughman to the head of one of the largest rose-producing nurseries in the country.

The chapters on preparation of the soil (though burnt earth is hardly a good substitute for organic manure), planting, pruning and general cultivation deal with the subject in a practical manner and in language which any amateur can understand; giving if anything too little of technical terms and the scientific side of the craft, yet adequate for general garden purposes. The chapters dealing with the control of pests and diseases are brief and I think a little too elementary, and appear to have been written before the advent of such materials as DDT and Colloidal Copper. There is sometimes an appearance of incompleteness, and I feel that had he lived he would have extended the book considerably to our benefit.

His selections of varieties, too, do not take advantage of the so much improved strains that have been introduced of recent years, though there is an added chapter by D. L. Flexman, President of the National Rose Society, to bridge this gap. I am sorry there is a perpetuation of the term 'Hybrid Austrian Briar'—an erroneous nomenclature for hybrids of *Rosa foetida* and *R. foetida persiana*, the 'Persian Yellow,' which never had anything to do with Austria (except perhaps to be grown there).

To the less experienced in Rose growing this is a book to be thoroughly recommended and it will give pleasure and instruction to many, while his amusing reminiscences of the Rose nurseryman's way of life will not be the least interesting parts of the book to very many more.

BERTRAM PARK

## ERRATUM

September JOURNAL, page 300, line 10, for *Veronica* read *Verbena*.

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## JULY 17, 1951

**JOINT BORDER CARNATION COMMITTEE**—Mr. W. G. FERRIS in the Chair, and six other members present.

**Exhibits**

Seedling S.20 and 'George Maxwell Gee,' both shown by P. Lower, Esq., 186 Woodward Road, Dagenham, Essex.

## JULY 31, 1951

**SCIENTIFIC COMMITTEE**—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

*Lilium Species.*—Mr. W. Bentley sent to the Committee a specimen of a Lily akin to *Lilium pardalinum* but with very narrow leaves and small anthers. Mr. W. T. Stearn undertook to report later on its identity.

*Abnormal Allium.*—Mr. E. A. Bowles exhibited a specimen of *Allium senescens* remarkable in that the umbel bore many two- to four-flowered peduncles up to 5 cm. long.

*Pedicularis siphonantha.*—A specimen of *Pedicularis siphonantha* in full flower was sent by the Harrogate Parks Superintendent for identification. This wide-spread Himalayan species is remarkable for the long tube of the corolla; the specimen shown had deep reddish-purple flowers. The plant had been grown from seed collected by Ludlow and Sherriff (L. & S. 19834). It was remarked that, although species of Pedicularis were considered to be semi-parasitic, in cultivation some of them had successfully been grown without hosts.

**FRUIT AND VEGETABLE COMMITTEE**—Mr. F. A. SECRETT, C.B.E., F.L.S., V.M.H., in the Chair, and nine other members present.

**Awards Recommended:**

*Gold Medal*

To the Hon. Mrs. Geo. Lane, Ashton Wold, Oundle, Peterborough (votes unanimous), for a group of Gooseberries and other miscellaneous fruits.

**Other Exhibits**

Black Currant 'Laxton's Giant' from Messrs. Laxton Bros. Bedford Ltd., Bedford.

**FLORAL COMMITTEE A**—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

**Awards Recommended:**

*Silver-gilt Flora Medal*

To Messrs. Blackmore & Langdon, Bath, for an exhibit of herbaceous plants.
To Messrs. P. de Jager & Sons (London) Ltd., London, for an exhibit of Gladioli.

*Silver-gilt Banksian Medal*

To Mr. J. Amand, Holbeach, for an exhibit of Gladioli.
To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of herbaceous plants.
To Messrs. Thomas Carlile, Ltd., Twyford, for an exhibit of herbaceous plants.
To Messrs. E. W. Stedman, Ltd., Longthorpe, for an exhibit of Roses.
To Messrs. E. Webb & Sons (Stourbridge), Ltd., Stourbridge, for an exhibit of Larkspurs.

*Silver Flora Medal*

To Messrs. M. Prichard & Sons, Ltd., Christchurch, for an exhibit of herbaceous plants.
To Messrs. R. W. Proctor & Sons, Chesterfield, for an exhibit of Roses.
To Messrs. Wheatcroft Bros., Ltd., Ruddington, for an exhibit of Roses.

*Silver Banksian Medal*

To Messrs. Drovers Gardens, Singleton, for an exhibit of Fuchsias.
To Messrs. Kelway & Son, Ltd., Langport, for an exhibit of Gladioli.
To Messrs. Mortlock Bros., Langley, for an exhibit of Fuchsias and Pelargoniums.
To Messrs. E. Webb & Sons (Stourbridge), Ltd., Stourbridge, for an exhibit of Sweet Peas.

*Flora Medal*

To Messrs. Frank Cant & Co. Ltd., Colchester, for an exhibit of Roses.
To Messrs. G. & A. Clark, Ltd., Dover, for an exhibit of herbaceous plants.
To I. G. Ginger, Esq., Acton, for an exhibit of hardy flowers.
To Mr. L. S. Harbutt, Wickhambrook, for an exhibit of Gaillardias and other herbaceous plants.
To Mr. E. B. Le Grice, North Walsham, for an exhibit of Roses.
To Mr. A. Miles, Bickley, for an exhibit of herbaceous plants.
To Messrs. Ryder & Son (1920), Ltd., St. Albans, for an exhibit of Roses.

*Banksian Medal*

To Messrs. Benjamin R. Cant & Sons, Ltd., Colchester, for an exhibit of Roses.
To Messrs. Wakeley Bros. & Co. Ltd., North Mymms, for an exhibit of herbaceous plants.

*Award of Merit*

To Rose 'Tantau's Surprise' (votes 12 for, 0 against), from Messrs. Wheatcroft Bros. Ltd., Ruddington.

**Selected for Trial at Wisley**

*Lathyrus latifolius* 'Kelmscott Snow Ball,' from Mr. E. J. Barker, Ipswich.
*Veronica spicata* 'Baccarole,' 'Minuet,' 'Pavane,' from A. H. V. Bloom, Esq., Bressingham Hall, Diss, Norfolk.

**To be seen again**

Rose 'Border King,' from Messrs. C. Gregory & Son, Ltd., Chilwell.
Rose 'Coral Queen,' from Messrs. W. Bentley & Sons, Ltd., Wanlip.

**Other Exhibits**

Pelargoniums, from J. S. Milne, Esq., Newcastle-upon-Tyne.
Pelargonium sport, from Lady Loder, Horsham.
Platycodon, from Mr. Stuart Bootham, Maidenhead.
Platycodon, from Messrs. M. Prichard & Sons, Ltd., Christchurch.
Verbascum, from Mr. L. S. Harbutt, Wickhambrook.
Violas and Roses, from Mr. C. A. Jardine, Feltham.

**FLORAL COMMITTEE B**—Lord ABERCONWAY, C.B.E., LL.D., D.Sc., V.M.H., in the Chair, and sixteen other members present.

**Awards Recommended:**

*Silver Flora Medal*

To Messrs. Kibble & Clare, Ascot, for an exhibit of rock garden and border plants.
To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Lilies.

*Flora Medal*

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.
To Mr. K. W. Harle, Lower Basildon, for an exhibit of succulents.
To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of rock garden plants.
To Messrs. L. R. Russell, Ltd., Windlesham, for an exhibit of greenhouse plants.

*Banksian Medal*

To Messrs. East Lodge Gardens, Enfield, for an exhibit of rock garden plants.
To Mr. C. Gilbert, Romford, for an exhibit of succulents.
To Messrs. Kew Topiary Nursery, Ltd., Richmond, for an exhibit of clipped trees.

**Other Exhibits**

*Escallonia* × 'Burkwoodii' (*montividensis* × 'C. F. Ball'), exhibited by Mr. D. Burkwood, Yew Tree Lane Nurseries, Rotherfield.
*Galtonia princeps*, exhibited by Messrs. Old Court Nurseries, Ltd., Colwall, Malvern.
*Lilium Wardii* forma, exhibited by C. J. Fuller, Esq., D.M., F.R.C.P., Duryard Grange, Exeter.
*Lilium Volmeri*, exhibited by W. Bentley, Esq., Quarry Wood, Newbury.
*Lilium* seedling No. 206, exhibited by Mr. G. L. Slate, N.Y. State Agr. Exp. Sta., Geneva, N.Y., U.S.A.
*Vaccinium cylindraceum*, exhibited by A. T. Johnson, Esq., Bulkeley Mill, Conway, N. Wales.

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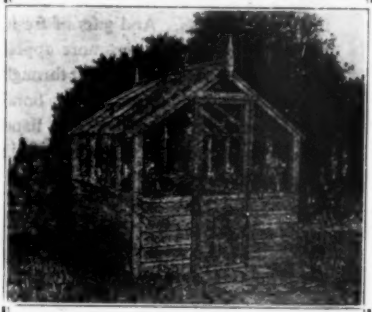

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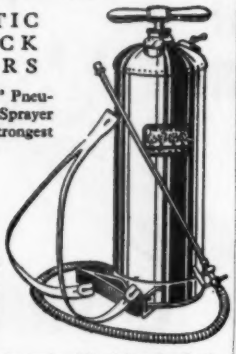

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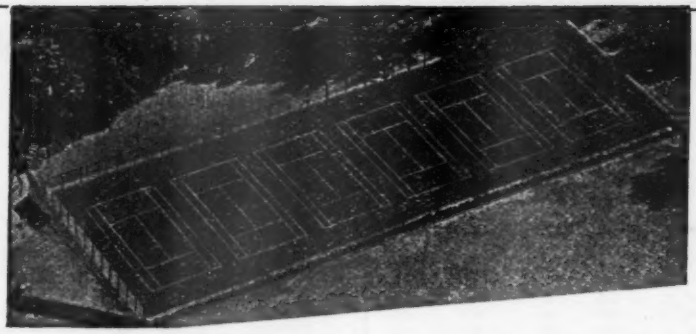

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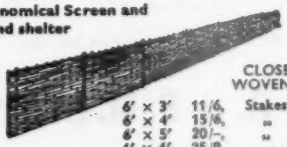

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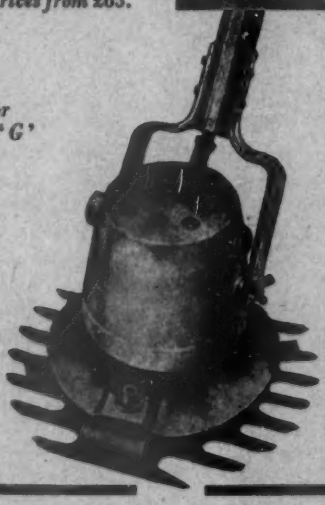

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